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# USSR Report

CONSTRUCTION AND RELATED INDUSTRIES

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16 April 1985

# USSR REPORT

## CONSTRUCTION AND RELATED INDUSTRIES

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## CONSTRUCTION PLANNING AND ECONOMICS

### NEW ECONOMIC MODEL FOR CONSTRUCTION OUTPUT RATES VIEWED

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA EKONOMICHESKAYA in Russian Jul-Aug 84 pp 33-40

[Article by R. M. Merkin and O. G. Solov'yeva: "Discussion Problems of the Theory of Intensifying Construction Production"]

[Text] The article examines the concept of intensifying construction production from the point of view of the contribution made by this sector to the process of the multi-faceted intensification of the national economy. The following three groups of discussion questions are elucidated: the characteristic of measuring intensification in construction; the system of indicators of intensification; the requirements for the indicators of elasticity being used in calculating the intensification. Justification is provided for the need of a targeted administration of the intensive development of construction production.

The economic strategy of the CPSU at the present-day stage, a strategy which provides for the conversion of the economy to an intensive path of development, presupposes the necessity for a well-planned and effective administration of this process (see [1]). Working out a precise theoretical concept of intensification would exert a substantial positive influence on it.

With regard to construction--the most important investment sector of the national economy--such a concept has not yet been worked out. This is connected both with the presence of certain objective difficulties, which do not allow the multi-faceted forms of construction to exert an influence on the process of national economic intensification, as well as with the lack of solutions to certain methodological problems.

Let us examine some of them, in particular, the following: the concept of intensification in construction; the subordination of the economic categories entitled "effectiveness" and "intensification"; the system of indicators of intensification; the requirements for the indicators of elasticity being used in the models of intensification.

CONCEPTS OF INTENSIFICATION IN CONSTRUCTION [in boldface]. Conversion to an intensive path of development in various spheres of the national economy has its own specifics, which are conditioned by the following factors:

characteristics of the sector as a sphere of labor application (the correlation between live and embodied labor in the process of production, technological characteristics, the nature of technical progress, the degree of influence by natural factors, etc.);

the unique nature of the requirements imposed on the sector by the national economy at each stage of development, the specifics of the contribution made by each sector to the process of national-economic intensification;

conditions of the reproductive process.

Present-day ideas on the essence of the intensification process within the investment sphere require a precise delineation between the concepts of "intensification of capital construction" and "intensification of construction production." Only with such an approach does the possibility appear of ensuring, in the first place, a quantitative measurement of the intensification process, and, in the second place, a targeted administration of those complex processes which, under the present-day system of administering capital construction, are regulated through various channels and various organizations,

Intensification of capital construction is connected with the process of curtailing the entire cycle of creating fixed capital, improving its use characteristics, and economizing on all types of resources being utilized. Intensification of capital construction manifests itself in a growth rate of fixed capital which outstrips the growth rate of capital investments, as well as in a curtailment of the aggregate outlays of resources and time expended on creating a unit of useful consumption effect (putting into operation a unit of capacity for producing metal of an assigned quality, 1000 kW of capacity of steam-, nuclear, and electric-power stations, 1000 tons of capacity for turning out cement of an assigned type, etc.).

Table 1

Type of project	Capacity	General norm for period of planning, construction, and assimilation, in months	Including construction, in months
Expansion of an AES with RBMK-1000 reactors, in thousands of kW	2000	123	78
Complex of a combination-type petroleum refinery (LK-67 type), in thousands of tons per year	6000	74	35
Tire-production plant, in millions of standard units per year	6	96	60
Plant for the commercial production of bleached sulfate pulp	250	114	54

We would particularly like to underscore the importance of the time factor. Thus, in accordance with the "Integrated Norms for the Period of Planning and Construction of Enterprises, Buildings, and Structures, and for Assimilating the Design Capacities" /4/, as approved by USSR Gosplan and USSR Gosstroy, the full cycle of planning, constructing, and assimilating many enterprises, even under the conditions of combining in time the processes of planning and construction, of construction and preparing the assimilation, requires 8--10 years (Table 1).

Reducing the length of time required for the reproduction cycle ensures the prevention of the rapid obsolescence of the means of labor coming on line, as well as that of production technology and the end product, it draws substantially closer the possibilities for productively utilizing the most effective innovations in the national economy, and it ensures a more rapid and fuller satisfaction of the population's consumer needs.

Intensification of capital construction is achieved by means of concentrating capital investments; limiting newly begun construction; maintaining more rigorous normative requirements in the formulation of plans; increasing the investment preparation by clients of capital investments to be used (on-schedule development of planning-estimate documentation, clearing away construction sites, on-time ordering of equipment, ensuring financing, etc.); substantially improving planning-design solutions, composing and blocking out workshops and enterprises within the framework of industrial complexes, industrial zones, territorial-production complexes, etc. at stages of working out general schemes for the development and deployment of production, design, and planning solutions. Finally, this is achieved within the creation of more economical and progressive means of labor and technological processes in machine building.

The factors set forth above, as well as many others, exert a determining influence upon the process of the intensification of capital construction but are not the direct result of construction production. Change in many technical-economic indicators depends, to a considerable degree, on the trend of capital investments, the planning solutions of facilities being modernized or newly erected projects and not only on the intensification of production in the sector entitled "construction." A considerable portion of these problems are solved outside the sphere of activity of construction production, i.e., on a higher level of national economic administration.

The "construction" sector functions under given conditions, when the program of capital investments, its structure, planning solutions, types and effectiveness of the equipment supplied, as well as the program's deployment throughout the country's territory, are presented to the system of construction organizations in the form of national-economic planning assignments.

From the viewpoint of the national economy the sector's task is to reliably carry out the assigned administration of the program at higher levels within the pre-planned time periods and with the appropriate quality.

The contribution made by the "construction" sector to intensifying the national economy may be traced along the following two lines: within the sector itself and outside of it.

Within the sector this is manifested by carrying out the assigned program of construction in reducing the aggregate resources of live and embodied labor, as calculated per unit of construction production (or an increase in the volume of production by means of a better utilization of all the resources being drawn into the process).

It is important that this line of intensification is sufficiently accurately and fully reflected within the use of the existing system of prices, norms, and normatives in the intra-production indicators of the activity of a construction organization (the dimensions of commercial construction output and the volumes of construction and installation operations, the levels of utilizing resources).

Outside of the sector, among the users of the construction product, this line is reflected in the form of additional volume of production or services from the facilities being put into operation (with the curtailing of the time periods for construction), economizing on operational expenditures, increasing the service life of products, cutting down on resources earmarked for capital and current repairs, speeding up the assimilation of production capacities and facilities being introduced (while improving the quality of construction).

The above-indicated forms of manifesting national-economic intensification, which are directly connected with construction activity, are not reflected in the intra-sectorial results within the system of estimated prices and the means of measuring production volume which have been adopted and are operating therein. This has been brought about by the fact that the price for a construction product is formed independently of the time periods of construction and its quality. Thus, when a facility is turned over for operation with a quality mark of "excellent," the construction organization receives exactly the same amount as it would if the facility being introduced had been merely of satisfactory quality, an amount equal to its full estimated value. An analogous situation likewise occurs with regard to the length of time required for construction: whether the construction periods for the same types of facilities are 1.0, 1.5, or 2 years, the construction organization is paid the full estimated value of their construction.

At the same time, the achievement of national-economic results in the form of curtailing the accumulated time periods and upgrading the quality of construction is linked with drawing in additional resources (production, financial, etc.) in this sphere of production. If the manifestations of national-economic intensification (external to this sector) are not taken into account (do not find public recognition), it is difficult to count on the motivation of the construction organizations to achieve the above-indicated results.

It is precisely these circumstances which predetermine the need to reflect in the concept of construction production intensification the two trends noted above. Unfortunately, the existing methodological developments are still oriented at examining the intra-sectorial aspects of intensification, and this substantially limits our ideas about this complex process.

In our opinion, the concept of construction production intensification must, by proceeding from the internally inherent characteristics of the given sector,

correctly consider its contribution to the process of intensifying the national economy. Functioning as the criteria of construction production intensification must be changes in the production volume, time periods, and quality of construction.

**EFFECTIVENESS AND INTENSIFICATION** [in boldface]. Of great importance for the entire ensuing exposition is the division and precise subordination of the concepts "production effectiveness" and "production intensification."

To our way of thinking, an extreme expression of an incorrect understanding of the subordination of these economic categories is the assertion that "increasing the effectiveness of production must ensure the speeded-up process of its intensification" [3, p 8]. A number of works propose that the processes of intensification be measured directly by means of the indicators of effectiveness.

With such an approach ideas inevitably arise that every kind of intensification (and any of its trends) is effective and that, at the same time, an increase in effectiveness is automatically linked with the process of further intensification.

As it seems to us, the precise demarcation between these concepts will allow us to reveal criteria which are peculiar to these categories. Moreover, the task of evaluating the effectiveness of the intensification process remains an important, independent task. This is all the more necessary in connection with the fact that construction is quite often characterized by cases of ineffective production intensification (for example, an excessive concentration of resources for speeding up construction, crash work, etc.). The basic distinctions between these economic categories are summarized as follows. Calculations of effectiveness are based upon the joint measurement of outlays and results; functioning as a result, moreover, is newly created value (in the form of national income, net output, or profit), and as outlays--those which are simultaneous (in evaluating the effectiveness of capital investments and fixed capital) or summary (simultaneous and current) in evaluating production effectiveness.

In calculating intensification the objects of joint measurement are the aggregate social product or its sectorial modifications (mandatorially including both the newly created and transferred values) as well as the resources being used (live and embodied labor).

Situations occur whereby, in calculating effectiveness, the need arises for jointly measuring the results of production with resources (such an approach has been stipulated, for example, in the "Methodological Directives for Working Out State Plans for the Development of the USSR's National Economy" [2, p. 46]. In such cases, however, these must be consumed (rather than applied) resources, and this brings about the need for their mandatory cost evaluation. In calculating intensification these can also be natural resources, and this requires their correct joint measurement based on the parameters of elasticity, coefficients of replacement, etc.

The proposed approach allows us to differentiate sufficiently precisely between the essences of these two economic categories and to eliminate their frequently encountered confusion in the economic literature.



From our point of view the uniform treatment of these questions is a necessary condition for creating a reliable instrumentality for measuring the process of intensification in order to productively administer this complex process.

**CONCERNING THE SYSTEM OF INDICATORS OF CONSTRUCTION PRODUCTION INTENSIFICATION** /in boldface/. Intensification of construction production consists of a sectorial development whereby speeding up the putting into operation of production and non-production types of facilities and upgrading the quality of the finished construction output is ensured by reducing the aggregate outlays of live and aggregate labor in the sphere of construction production per unit of construction end product.

A similar approach is also reflected in the system of intensification indicators proposed by us; it includes intra-sectorial as well as national-economic manifestations of this process.

It must be borne clearly in mind that production intensification is not an end in itself but rather a very important means for increasing production efficiency. Likewise stemming from this is the objective necessity for evaluating the individual trends of intensification and their range in order to choose the most feasible national-economic criteria of effectiveness (including the effect gained by reducing the time period required for construction and upgrading its quality).

The concept of construction production set forth above corresponds to the following system of indicators:

1. An integral intensification indicator, which reflects in a comprehensive way both the national-economic as well as the intra-sectorial results of construction production intensification.
2. Indicators of the portion of the contribution made by intensive and extensive factors to the development of construction production.
3. Indicators of the replacement of live labor by fixed production capital.
4. Local indicators of intensification, reflecting the levels of use of individual resources of construction production--live labor, the means of labor, and the objects of labor.

The integral indicator of intensification gives us an idea about the correlation between the dynamics of end results (the volume of construction output, the time periods, and the quality of construction) and the dynamics of all the resources being used (the number of workers, the dimensions of the fixed and working capital assets in the portion of the material reserves). This allows us to evaluate the path of a construction organization's development and administer the process of converting to the rails of intensive development.

The composition of the intensification indicators is determined, to a large extent, by the circle of problems which must be solved by planning practice in this sector.

In particular, many specialists consider it "superfluous" to elucidate the boundaries between replacing some resources by others and to evaluate the portion of the contribution made by the intensive and extensive factors to the development of construction production.

The differences in approaches depend, to a considerable extent, on the authors' presentation of those problems for the sake of whose solution the system of indicators under discussion has been created.

If we regard the process of intensifying construction as objective, not subject to or requiring comprehensive supervision and administration, then, obviously, we could limit ourselves to evaluating it in a passive way. The principal arguments of the advocates of such an approach consist of asserting that the individual aspects of this process are administered in the traditional way (the magnitudes of the output being produced, the individual types of resources). Likewise stemming from this is the conclusion regarding the feasibility of simplifying and limiting the system of intensification indicators by calculating the levels of utilizing the aggregate resources and each resource in isolation.

But if we regard the intensification of construction production primarily as a consciously controllable process, the thrust and results of which depend, to a large extent, on people's activity, then we need such a system of indicators on the basis of which it would be possible not only to passively evaluate events which have already taken place but also to actively influence the course of this process.

In this connection, it is not a matter of indifference, for example, as to what kinds of contributions are being made by intensive and extensive factors to the development of construction production, to the development of the construction organizations' production capacities. If during the 9th Five-Year Plan the proportion of the contribution made by intensive factors for the individual ministries varied from 20 to 54 percent, while during the 10th Five-Year Plan it varied from 5 to 20 percent, then this is a shrill signal--during the 11th Five-Year Plan we have to change the unfavorable correlations between the growth rate of labor productivity and its capital-labor ratio, as well as to shorten the length of time required for construction cycles and to upgrade the quality of the capital assets being put into operation.

As surveys have shown, administration of the process of construction intensification is still far from perfect, and this is to be explained, in large part, by the shortage of reporting and planning information concerning the course of this process.

The proposed system of indicators opens up possibilities for targeted and multi-faceted forecasting, along with medium-range and current planning of the intensification process.

The complexity, multiple aspects, and contradictory nature of the process of intensifying construction production, the need to reflect in its evaluation the most important national-economic ties along with the intra-sectorial ones does not allow us to express the principles of intensification in any one, partial indicator. Reliable ideas concerning the process of construction

may be obtained only on the basis of specially constructed summarizing indicators which reflect various manifestations of this process in the aggregate.

Developing such indicators is, however, connected with certain difficulties of a methodological, informational, and computational nature.

The first of these is caused by the need to select a rational indicator for production volume. Serving this function for a long time in construction was the volume of construction and installation work, which did not, however, provide any idea concerning the end product of the construction organization. It would seem that conversion to planning the volume of commercial construction output would solve this problem. It is well known, however, that the commercial construction output of a given year, within the length of a construction cycle exceeding the calendar year, is a result of the organization's activity over a number of years. At the same time there is a lack of a genuine opportunity to compare the results achieved (in the form of commercial output) with the annual volumes of resources, for separate accounts have not been organized for resources being used at start-up and non-start-up projects.

In essence, the following dilemma has arisen: whether to return to the indicator of the volume of construction-and-installation work as a measuring-rod of production volume for the sake of a formally "strict" joint measurement of output and resources or to give preference to a contents-type treatment of the problem. In our opinion, it is feasible in calculating intensification to rely on the indicator of commercial construction production. The fact is that objectively increasing the volume of construction-and-installation work in and by itself does not characterize the contribution to the process of national-economic intensification. And even to the contrary. It is a well-known fact that during the years 1976--1980 practically the entire increase in the volume of the construction-and-installation work which was performed "accumulated" in unfinished construction; the latter grew from 76 percent (of the amount of capital investments) as of 1 January 1976 to 87 percent by 1 January 1980. Proceeding from this, regarding the growth in the volume of construction-and-installation work as an indicator of the contribution made to intensification is unacceptable on grounds of principle.

At the same time in a number of instances at many construction organizations reducing the volume of commercial construction output has not been linked with a worsening of their work but rather reflects the specifics of the plan assignment, the status of the projects under construction, and, finally, the nature of the facilities being built. It is, therefore, impossible to evaluate the activity of construction organizations solely by the dynamics of a generalizing indicator of intensification. With this goal in mind, it is proposed to compare the actual values of a generalizing indicator with the plan assignment, in which the specifics indicated above can and must be reflected.

Local indicators of intensification characterize the levels of use of individual resources and ways to develop them.

The indicator characterizing the level of use of fixed production capital is the volume of commercial construction output per ruble of average annual cost of fixed production capital assets.



The level of use of live labor can be determined by the following three indicators: the growth rate of labor productivity, economizing on live labor, and the proportion of increase in production volume by means of increasing labor productivity.

The characteristic of the use of working capital is determined by the acceleration of the turnover rate of this capital as a result of increasing the number of its turnovers.

**CONCERNING THE INDICATORS OF ELASTICITY USED IN MODELS OF INTENSIFICATION** /in boldface/ An important characteristic of the process of economic development (particularly at the present-day stage) is comprised of the indicators of elasticity of resources. Economic calculations make use of various types of indicators of elasticity (resource as well as value types): calculated in accordance with the actual, individual values of replacing one resource by another, average-sectorial, actual values, as well as boundary-type, national-economic values.

A good idea of the degree of spread among the actual values is provided by the following examples. With an average, country-wide indicator for the replacement of one worker per year by fixed production capital during the period 1981--1982 amounting to 10,600 rubles, the value of this indicator for the construction organizations of the USSR Ministry of Construction of Heavy Industry Enterprises amounted to 12,100 rubles, while for those organizations of the USSR Ministry of Construction this figure amounted to 13,800 rubles. The differentiation in this indicator is likewise great depending on the degree of production concentration: for construction organizations of the basic unit of administration with an annual program of operations of as much as 5 million rubles it amounts to 16,900 rubles, and with a program of more than 25 million rubles it amounts to 9,100 rubles.

Also substantial are the territorial differences in the magnitude of the replacement indicator: in the central region it is 40--50 percent lower than in the country's northern and eastern regions.

Correct use of the elasticity indicators in the models of intensification (i. e., resource models) presents specific demands on the economic characteristics of the replacement indicators. In our opinion, the contents-type treatment of the indicators of elasticity in the models of elasticity boils down to the following: it is feasible to increase the magnitude of a resource being drawn in when freeing up a unit of another one as much as necessary in order to maintain an unchanged volume of production output (taking quality characteristics into account). Proceeding on the basis of such a treatment, it would not be justifiable to utilize the resource cost indicators (not even to mention the production costs) in the intensification models, because it is only the physical values of the resources being replaced which should be taken into consideration. It would be just as unjustifiable, in calculating intensification, to utilize the norms of comparative effectiveness for the joint measurement of heterogeneous resources.

This determines the necessity for dynamic calculations to reflect the dynamics of prices on those resources which, in the models of intensification, are, by necessity, accounted for not in physical but in value terms (fixed and working production capital).

Calculations which have been made for the "construction" sector and for the leading construction ministries testify to the substantial growth in the "price" of replacing one yearly worker by fixed production capital (Table 2).

Table 2

Indicators	For construction as a whole	Including		
		USSR Ministry of Heavy Industry Enterprises	USSR Ministry of Construction	USSR Ministry of Rural Construction
Price of replacing one yearly worker by fixed production capital for construction purposes, in thousands of rubles				
1970	5.2	3.8	4.7	2.9
1980	15.4	11.3	12.4	8.5
1980 as a % of 1970	296	297	264	293
Labor productivity in 1980 as a % of 1970				
	143.0	147.8	145.3	131.2
Outstripping of prices on fixed production capital, as compared with the growth in their productivity during the years 1970--1980, in %				
	1.11	1.11	1.11	1.11
Real physical growth in the price of replacing one yearly worker (taking into account the change in labor productivity and OPF /fixed production capital/ prices, in %				
	187	182	164	201

Completely different conclusions are reached by evaluating the boundary limited (from the viewpoint of developmental effectiveness) dimensions of the price of replacing one yearly worker by production capital in construction. Proceeding from the data of the inter-sectorial balance, the replacement of one yearly worker in construction is effective on condition that the value of the additionally drawn-in fixed and working capital for construction purposes does not exceed 9,700 rubles. Otherwise, the aggregate labor outlays for the entire chain of the national economy, as embodied in production capital, exceed the savings on live labor outlays (in direct labor criteria).

From our viewpoint, the great importance of the boundary indicators of elasticity lies in the fact that they provide us with an idea of the limits of effective replacement and aim at achieving them (in particular, by means of improving the use of aggregate resources).

In connection with this, all attempts at carrying out calculations of intensification based on the so-called "equivalent assets," those constituting not an equivalent of the physical replacement of live labor but rather indicators of the effectiveness of an analogous replacement (i.e., reflecting its influence on a change in the production costs or profits of a construction organization), are not suitable for the given purpose. Their application is feasible in evaluating the effectiveness of intensification.

In real forecasting models of development the direct use of this dimension does not permit us to solve the problem of maintaining production volume at an unchanging level when freeing up one yearly worker.

Therefore, in order to jointly measure heterogeneous resources in models of economic development, the following is recommended: in retrospective calculations use the actually formed parameters of elasticity, in forecasting calculations--the values of these parameters capable of being modeled, taking into account the actually allowable levels for utilizing various resources, which, in a number of cases, may likewise not attain the optimal (or boundary) values of replacement, characterizing the effective measure of replacement.

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## CONSTRUCTION PLANNING AND ECONOMICS

### ESTONIAN CAPITAL CONSTRUCTION PLAN NOT FULFILLED

Tallinn SOVETSKAYA ESTONIYA in Russian 14 Dec 84 p 1

[Article: "Construction: the Results of 11 Months"]

[Text] At the November 1984 session of the CPSU Central Committee Politburo, Konstantin Ustinovich Chernenko said that capital construction is one of the main problems. In this area, high growth rates, a large concentration of resources and improved utilization of materials, equipment and mechanisms make up the ideal. This gives us a foundation upon which to hope that the builders can put an end to rush work, and that they will begin, finally, to cope with their plan assignments.

Capital construction problems occupy an important place in the work of the republican party organization, and are constantly in the center of attention of gorkoms, party raykoms, and primary party organizations. As a result of measures taken during 11 months of this year, a production wing of the Tallinn Electric Equipment Plant imeni M. I. Kalinin, the Kommunar Association Chrome Leather Tannery in Narva, a berth at the Novotallin Maritime Trade Port and a number of other facilities have been put into operation, amounting to a total volume of R412 million in state capital investments.

In addition, about 500,000 m<sup>2</sup> of housing, 1,230 children's preschool places, and 3,894 nonspecialized school spots have been put into operation.

Fulfillment of the plan for output for construction and installation operations for November of this year amounted to 103.2 percent, with growth by the corresponding period of 1983 at 4.2 percent.

However, our successes would have been considerably greater, had the capital investments provided for in the plans been fully developed. According to the results of work for the period from January to November, construction and installation administrations of the Estonskaya GRES [State Regional Electric Power Station], the Sevteplomontazh [possibly Northern Heating Equipment Installation] Baltic Area Installation Section, the Sevensnergostroy [Northern Power Station Construction] Trust, the Estelektroset'stroy [Estonian Electric Power Network Construction] Trust, the Estonian SPMK [Specialized Mobile Mechanized Column] of the Elevatorstroy [Elevator Construction] Trust, the Estonian Repair and Construction Section of the Sevzapkuror tremstroy [Northwestern

Health Resort Repair and Construction] Trust, the Minlegprom [Ministry of Light Industry] RSU [Repair and Construction Administration], the Minpishcheprom [Ministry of the Food Industry] RSU, mobile mechanized construction and installation columns of link [svyaz'] No 1 and No 2, the ESSR Academy of Sciences Construction Administration, and the Tartugaz Trust's PMK [mobile mechanized column] are not fulfilling the plans for contract jobs with their own work forces.

As a result, the plan for developing state capital investments during 11 months of this year was only 90 percent fulfilled, and the plan for construction and installation work only 94 percent fulfilled. In many instances, the assignments went uncompleted as a result of too little state discipline and an absence of the requisite exactingness on the part of primary party organizations toward the administrators of construction subdivisions and the buyers, in reference to the efficient organization of labor at the project sites, the timely provision of material and technical resources, equipment, planning and estimation documents and financing to the construction projects.

In the time remaining before year's end, there is still a lot of work to be done, and capital assets to be used from state investments to the tune of R230 million, or 36 percent of the year's plan.

As part of those already operational, additional production areas must be put into operation for the Electric Equipment Plant imeni Kh. Pegel'man, the Estoplast and Pioneer Plants, power transmission lines for agriculture, transformer step-down stations, automatic telephone stations, a regional communications junction in Valga, a motor vehicle maintenance station, a bath-house in Narva, a rayon hospital in Vilyandi, silos, hay-barns and feed-preparing plants for animal husbandry, warehouses, retail trade and public catering bodies, 230,000 m<sup>2</sup> of residential space, and 1,290 spaces' worth of kindergartens in Tartu, Pyarnu, Narva-Yyesuu and Akhtme.

Along with completing the yearly program of start-up operations, the construction collectives and purchasing enterprises are still faced with the task of organizing their construction starts so that facilities will be put into operation in 1985. And completion of this task must be placed under the direct control of party, soviet and economy agencies.

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## CONSTRUCTION PLANNING AND ECONOMICS

### ITALIAN EQUIPMENT, MATERIALS IN USSR CONSTRUCTION SURVEYED

Moscow STROITEL'NIYE MATERIALY in Russian No 1, Jan 85 pp 27-28

[Article by V.A. Golubkov, deputy chief of Foreign Relations Administration of USSR Ministry of Construction Materials Industry: "Cooperation with Organizations and Firms of Italy in the Field of the Construction Materials Industry"]

[Text] One of the most important directions in the sphere of strengthening peace and security in Europe and the whole world is that of mutually beneficial interstate economic and scientific-technical relations.

The construction materials industry occupies a definite place in the development of these relations and international division of labor and in the solution of social and economic problems.

Beginning with 1966, the USSR Ministry of Construction Materials Industry has been carrying out within the framework of agreements on economic and scientific-technical cooperation between the USSR and Italy with Italian organizations (the Italian Ministry of Industry, Commerce and Crafts and the like) and firms within the framework of the Soviet-Italian work group on scientific-technical and economic cooperation in the field of the construction materials industry and equipment and machines for their production.

Cooperation with Italian firms is conducted in the following directions: quarrying of natural stone; production of ceramic tile and ceramic sanitary items; development and introduction of automated equipment for pouring nonferrous alloys on a copper base and cast iron in the fabrication of sanitary engineering items; production of asbestos-cement pipes, glass, brick, tile and products from gypsum.

Scientific-technical cooperation was carried out on the subject "Improvement of the Technology of Quarrying and Working Stone and Complex Utilization of Waste Products of Stone Working" of the VNIPIIstromsyr'ye Institute and the Italian firms of Benetti and Breton. The parties exchanged information on the given subject and delegations of specialists with visits to production enterprises and scientific centers both in the USSR and in Italy for the purpose of studying work methods of enterprises in quarrying and working

natural stone and fabricating synthetic tile on a cement and polymer base with marble filler.

The Benetti firm turned over documentations on the technology of working marble quarries with the use of such types of equipment as cable saws with free abrasive and diamonds, line drilling machines, hydraulic wedge units, derricks-cranes and others. The VNIPIIstromsy'r'ye and the NIIKS institutes turned over to the Benetti firm documentation on a diamond cable cutter and a diamond cable design for a diamond cable saw.

The parties utilize the information and documentation in planning new quarries and designs of machines and mechanisms for quarrying of block stone and in particular for the production of a diamond cable saw, as well as the technology of its employment and method of connecting the cable under quarry conditions.

The Benetti firm, in accordance with concluded contracts, shipped to the USSR different equipment for the stone-quarrying industry (derricks-cranes, [\*\*]"Flouspac" hydraulic wedge units and Model 166 hydraulic devices and other equipment).

The VNIPIIstromsy'r'ye Institute is conducting joint operations with the firms of Terzago and Pellegrini on introducing new equipment and production technology of facing materials from natural stone. In accordance with the work plan, the VNIPIIstromsy'r'ye Institute turned over to the Pellegrini firm a diamond cable 22 meters in length in exchange for a Telediam quarry unit. This device underwent testing with Soviet diamond cable at the Chichkan Quarry of the Kirghiz SSR Ministry of Construction Materials Industry in 1983 and showed good results. The Terzago firm according to the work plan turned over to VNIPIIstromsy'r'ye Institute a working head with the drive of the TD12zh orthogonal machine and three diamond disk saws with reduced noise production. At VNIPIIstromsy'r'ye Institute, this head will serve as the basis for a stand for checking on the efficiency of diamond disk sawing of granite of different USSR beds.

In the past 10 years, such Italian firms as Bra, Breton, Benetti, Terzago, Pellegrini, Gregori, Te Ma, Chiesa Milano and Minali ship machines and equipment to the USSR for quarrying and working of natural stone. The Chiesa Milano and Longinotti firms delivered to the USSR equipment for the production of masaic tile.

In the future, Soviet organizations will examine the feasibility of cooperating with the Fratelli Mordenti firm in regard to equipment for stone working, including equipment for vertical sawing of marble and granite. In November 1983, this firm conducted a symposium in Moscow for Soviet specialists on achievements in the field of utilization of saws for cutting blocks of marble, granite and others.

As a result of the scientific and technical cooperation of NIIstroykeramika Institute and the Italian Sacmi firm on the subject "Development of Modern Technological Equipment for the Production of Ceramic Tile" and on the basis



of a Soviet license, an automated flow-conveyor line was designed for production of ceramic tile with a capacity of 100 square meters per hour.

Taking into consideration the positive experience of cooperation, NIIstroykeramika Institute and the Sacmi firm found it useful to continue joint work on improving equipment used in the production of ceramic tile.

For this reason, the parties in the immediate future will examine and coordinate the work plan of joint work on the question of devising an automated flow-conveyor line for the production of decorative ceramic tile for floors of wide assortment with a yearly productivity of 500,000-700,000 square meters, with a 3-shift furnace operating regime and a 1-2-shift pressing and sorting sectors' operation. The parties reached a preliminary agreement that the NIIstroykeramika Institute would develop a furnace of new design and the Sacmi firm--glazing and packing machines and storage devices.

The Sacmi firm is a traditional supplier of equipment to the USSR. Thus in the last 3 years, it has exported: equipment for the production of ceramic tile for the Voronezh Plant of Ceramic Products of the RSFSR Ministry of Construction Materials Industry, a technological line for drawing a series graphic design on the surface of ceramic tiles for the Baku Combine of Asbestos-Cement and Ceramic Products of the Azerbaijan SSR Ministry of Construction Materials Industry; an automatic line for glazing and triple covering of ceramic tile for Dvarchenskiiy Construction Materials Combine of Lithuanian SSR.

Cooperation is continuing between the NIIstroykeramika Institute and the Siti firm on the subject "Development of Technology of Automated Flow Production of Sanitation Ceramic Products on the Basis of Modern Equipment for Preparing Mass, Casting, Drying, Glazing and Firing."

In accordance with the work plan of scientific and technical cooperation, a meeting was held in Moscow in May 1984 of specialists from NIIstroykeramika Institute and the Siti firm. Soviet and Italian specialists discussed the results of mutual cooperation and noted that as a result of the work done the Soviet side developed mechanized stands for casting wash basins and toilet fixtures (technology and equipment) and an automated drier for drying sanitation products and making and working them under industrial conditions. The Siti firm developed and turned over to the NIIstroykeramika Institute general mass-production schemes as well as working drawings of a gas-fueled furnace with automatic regulation of the head process for firing sanitation products.

The question is being examined of possible scientific-technical cooperation between Rossantekhprom Production Association and the Triulzi firm on developing, manufacturing and introducing robots and manipulators for the application of dry powder enamels to or cast-iron bathtubs.

In the future, the question may be examined of cooperation with the Montec and Cidneo firms in the field of production of sanitation ceramic products and built-in items for bathrooms as well as with the Ispra firm on technology and equipment for the production of extra long asbestos-cement sheets of the



Magnium type as well as with the Italian firm of Gremigni on equipment for the production of asbestos-cement products and pipe with the injection method.

Within the framework of cooperation the following construction materials made by enterprises of the USSR Ministry of Construction Materials Industry and republic ministries were exported from the USSR to Italy in the period of 1980-1984: asbestos (importer--the Sitco firm), window glass (importer--the Alcardi firm), glassware, including crystal items (importer--the Danoc firm), perlite (importer--the Dicalite firm), marble and granite (importers--the Anro and Redgranit firms). In 1980, graphite and shaped glass were exported to Italy from the USSR>

Various Italian firms ship to the USSR technological equipment for the construction materials industry. The Otem firm has supplied machines for packing plaster bandages for Ivano-Frankovsk Cement and Slate Combine, the Olivotto firm shipped two sets of technological equipment for producing thermoses and the Cugher firm shipped to Bor Glass Plant equipment for making electrically heated glass for motor vehicles.

With the cooperation of the USSR State Committee for Science and Technology and the Italo-Soviet Chamber of Commerce, a symposium was held for Soviet specialists by the Italian Sabo and Bedeschi firms on the subject "Equipment for Working Clay, New Types of Technology for Production of Brick and Tile"; by the Italian Carlo Nobili Rubineterie firm on the subject "Modern Technology of Household Sanitary-Engineering Water-Distribution Fixturea Based on Modern Design"; by the Italian Benetti and Breton firms on the subject "A New Technology of Quarrying and Working Marble and Granite. Optimal Use of Waste from Working with Marble." With the cooperation of the USSR and Georgian SSR State Committee for Science and Technology and the Ministry of Construction Materials Industry, the Italian Bra firm conducted a symposium in Tbilisi for Soviet specialists on the topic "Modern Technology and Equipment for Working Marble and Granite."

Over the years of cooperation 13 plenary meetings of work groups were held alternately in the USSR and Italy. At the last meeting of the work groups in Rome, on the Soviet side, representatives of the USSR and the RSFSR Ministry of Construction Materials Industry, the USSR State Committee for Science and Technology and the USSSR Embassy in Italy took part.

On the Italian side, representatives of the Ministry of Trade, Commerce and Crafts of Italy, the Institute of Foreign Trade of Italy as well as presidents, vice presidents and managers of Italian firms took part in the meeting.

As a result of the meetings and encounters, achievements attained in scientific-technical and economic cooperation between Soviet and Italian organizations in the field of construction materials, equipment and machines for their production and prospects were outlined for further developing and deepening cooperation.

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## CONSTRUCTION PLANNING AND ECONOMICS

### ECONOMIC EXPERIMENT STRESSES CONTRACT OBLIGATIONS

Moscow EKONOMICHESKAYA GAZETA in Russian No 52, Dec 84 p 5

[Article by Yu. B. Kolokolov, secretary of the Belorussian Communist Party Central Committee: "A Real Incentive for Efficiency"]

[Text] The magnitude of capital construction in the republic may be judged by the following facts. After three and one-half years of the current five-year plan 15.4 million square meters of gross floor space has been put into use in housing units, general education schools have been built to serve 110,000 students, and kindergartens and nurseries for 95,000. Many hospitals, polyclinics and other projects for cultural and service purposes have been built. The capital construction plans that were established for this period have been met. The production capacities in our associations have grown substantially: "BelavtoMAZ" [Belorussian Motor Vehicle Plant], "Gomel'mash" [Gomel' Machine Building Plant], "Bobruyskshina" [Bobruysk Tire Plant], "Azot" [Nitrogen] in Grodno, "Steklovolokno" [Fiberglass] in Polotsk, and a number of other enterprises.

The ever growing pace and scale of construction requires, without a doubt, a new approach to solving the multifaceted problems of organizing and managing it. The CPSU Central Committee and USSR Council of Ministers decree "Concerning an Improvement in Planning, Organizing and Managing Capital Construction" and the instructions and recommendations on these problems by K. U. Chernenko are aimed at precisely this.

### FROM EXPERIMENT TO BROAD PRACTICE

A certain amount of expertise in improving construction production has already been accumulated in the republic. For example, during the 10th Five-Year Plan an experiment was already begun to improve the planning involved with the production and economic activities of the BSSR Ministry of Industrial Construction and the republic's Ministry of Installation and Special Construction. The main goal of the experiment was to develop economic measures that would have an influence on further improving the effectiveness of construction production and capital investments, reducing the duration and improving the quality of construction, and increasing labor productivity.

The experience gained from construction organizations that operated under the new management conditions proved that the system of indicators and economic

incentives that was established tends to accelerate the start-up of capacities and projects and forces material, technical, labor and financial resources to be concentrated on starting structures. It is sufficient to say that the duration of construction for BSSR Ministry of Industrial Construction projects decreased by 13 percent and the level of incomplete construction was substantially reduced during this time.

At the same time several dark sides were also revealed. The point being stressed most of all concerns the unequal material responsibility of all the participants in the construction process--the clients, designers, and suppliers of equipment, building materials and components--to meet the plans. The schedule for putting production capacities into operation is often not met, for example, due to a lack of the technological equipment required, the failure to provide design and estimate documentation on time, or due to other reasons that are not dependent on the contractor organizations.

During the 11th Five-Year Plan Belorussian builders are attempting to utilize the additional potentials for increasing the efficiency of capital investments. In September of 1982 an experiment was begun in republic construction organizations aimed at reducing the estimated cost of construction and lowering material and labor expenditures by analyzing the expertise of the GDR in production efficiency and in conserving energy, labor and material resources.

The basis of the experiment is a stable (contracted) cost for construction products which was used for capital investment planning, for concluding contract agreements, and for evaluating the activities of construction organizations. The savings that were achieved as a result of the working design and during construction of the project and determined by the difference between the estimated cost of the construction and installation work based on the contract price and the working drawings will act as additional sources of economic incentives for construction and design organizations and the client. This is a real incentive for accelerating scientific and technological progress and for improving construction production efficiency on the basis of it.

It should be noted that the circle of participants in the experiment is continually expanding which may be judged by the following figures. During the first year 24 design organizations participated in the experiment that worked out the documentation for 145 projects having a cost of 146 million rubles for the construction and installation work. Today, 59 design organizations and 75 construction associations, trusts and housing construction combines operate under the conditions of the experiment. More than 700 projects for various purposes are included in the experiment having a total estimated cost of about 700 million for the construction and installation work.

We will continue such work and expand its scale in the most active manner. We believe that this is a very important task for the state. Looking at just the first results they appear extremely promising. The status as of the first of July of this year is that design work was completed and inspections made of 248 projects. The savings achieved through the application of scientific and

technical achievements for these projects amounted to 11 million rubles or 4.9 percent of the cost of construction commodity production. A reduction of more than 10,000 tons in the consumption of metal and 18,300 tons of cement was achieved. The consumption of labor was reduced by 246,000 man days.

#### INDUSTRIAL CENTERS AND SAVINGS

An overall program was worked out in the republic for improving the organizational and technical level of construction in five contractor ministries during the 11th Five-Year Plan. Nine special-purpose programs are being implemented on the basis of it in the republic. Among them are programs concerning problems in technically retooling and reconstructing enterprises that turn out precast reinforced concrete, for reducing manual labor in construction, for automating design work, and others.

By meeting the goals specified by the special-purpose programs it has been possible to increase the level of industrialization for construction as a whole to 67 percent and to 70 percent for housing construction during the current five-year plan.

Industrial enterprises are located and built in the republic, as a rule, in industrial centers--the number of which has already reached 50 today. More than 450 enterprises with a total amount of capital investments greater than 8 billion rubles, 6.4 billion of which have been utilized, are concentrated in industrial centers. This has made it possible for us to save 560 hectares of arable land and more than 200 million rubles of capital investments. Operating expenses were reduced by almost 45 million rubles. And it is quite natural that during the current five-year plan 75 percent of capital investments will be allocated toward industrial construction concentrated in industrial centers.

Under the constant control of party agencies we have taken on the problems of improving the level of mechanization in construction and installation work, developing a material and technical base for construction, and improving the organizational structure of management. In particular, practice has shown that the consolidation of construction subdivisions with their inherent specialization will provide a significant return, make it possible to improve efficiency in managing construction production while reducing the duration of construction for projects, lowering the cost of construction, and improving labor productivity at the same time. Thus, in every one of our oblasts there is now a single association of interkolkhoz construction organizations with a volume of work between 500 and 700 million rubles per year.

This is a large volume of work but due to the fact that the associations have not only their own general construction subdivisions but also specialized subdivisions, their own motor vehicle transport, and their own production base, they are successfully meeting the assigned goals. About 30 percent of the construction trusts and associations in the BSSR Ministry of Industrial Construction and the BSSR Ministry of Rural Construction also have volumes of work greater than 40 million rubles every year.

Unfortunately, at the same time one of the most important questions, from our point of view, has not been solved up to now--incentives for engineering and technical workers in organizations in the first category that have completed volumes of work above the goals that were set. A trust can have a volume of construction and installation work that is 30 or 70 million rubles but the pay for engineering and technical workers remains the same. Yet in the second case the load on a worker is substantially greater. Such a state of affairs must, undoubtedly, be corrected.

#### A SINGLE CLIENT IS NEEDED

The service of a client plays no small role in the matter of successfully meeting the capital construction plans; however, at the present time it is far from perfect and we are searching for a way to restructure it. Practice has shown, for example, that the greater the number of clients that participate in the construction of projects in one settled region, the harder it is to solve which are associated with the overall design and others. And vice versa--where design and construction questions are concentrated in one organization's hands these tasks are done more effectively. This means that a single client is needed in a city, rayon and oblast.

We have traveled along the road toward forming such a single client service. This function has been entrusted to the capital construction administrations in oblast, municipal, and rayon ispolkoms. For example, the UKS [Capital Construction Administration] in the Minsk Municipal Ispolkom is the client for the construction of 85 percent of the projects intended for housing, cultural and service purposes in Minsk at the present time. More than one half of the production and non-production projects in rural locations are being built through UKSs in rayon ispolkoms.

The initiative of party committees in large cities appears interesting; they are attempting to form single party organizations that would unite communists in construction and installation organizations, specialized sections and management boards to be the clients for the enterprises that are under construction in the same city. Such party organizations are effectively influencing the pace and quality of construction and are helping to ensure that operations are coordinated.

There is one other important question--the adoption of the brigade contract method. There are now about 6,000 contractor brigades in the republic. They unite more than 80,000 workers. These collectives complete more than 60 percent of the total volume of construction and installation work. Cost accounting brigades turned over more than 8,000 projects and complexes for use last year. Based on calculations made by economists, labor productivity in contractor brigades is 36 percent higher than the average for the sector. As a rule, the quality of the work that is done by the contractor brigades is also higher.

We well understand that there are still quite a few deficiencies, difficulties, and unsolved problems in organizing capital construction in the republic. In particular, the practice of turning over projects beyond the

standard timeframe has not been completely eliminated. Such an advanced form of organizing and motivating labor as the continuous flow contract is being adopted more slowly than desired. We are struggling with these deficiencies and sharply criticizing those who permit them.

The resolutions of the session of the USSR Supreme Soviet that discussed and approved the state plan and budget for the new year, 1985, have called for a higher level of labor activity among construction workers and all workers in the republic. Everything will be done in order that construction organizations meet the goals that have been set for them.

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## CONSTRUCTION PLANNING AND ECONOMICS

### BOOK REVIEW ON USSR CAPITAL CONSTRUCTION MANAGEMENT

Moscow KHOZYAYSTVO I PRAVO in Russian No 10, Oct 84 pp 95-96

[Review by A. Podoprigora, doctor of juridical sciences, and V. Shcherbina, candidate of juridical sciences: "A Combined Investigation"]

[Text] As noted at the December 1983 CPSU Central Committee Plenum, the realization of our plans for increasing industrial production, strengthening the material and technical base of agriculture, and improving workers' living, cultural and domestic conditions are all directly connected to capital construction, under the present-day conditions of business management. That is why there is a need to sharply increase the effectiveness of capital investments, to put productive capacities and facilities into operation faster, and there is also a need for overall improvement in the basic elements of the economic mechanism in construction, i.e., the organizational structure of its administration on all levels and in all links, its system of planning, financing, credit and economic stimulation, and the organization of its legal services.

The work under review\* is an attempt to investigate the problems which have arisen in this connection.

Taken as the basis for the present-day tendencies of the economic mechanism in this, the leading sector of the economy, construction has been approached as a unified investment process, which predetermined the inclusion into the authors' scope of all those who participate in construction, i.e., the planners, purchasers, contractors, financing and supply agencies, etc. The work elucidates the sectoral, territorial and functional principles of the economic mechanism's structure, and their interaction with the principles of the overall organization of the Soviet economy in sufficient detail. There is a deep analysis of the general scheme of construction administration. As the book points out, the proposed approach permits gaps and deficiencies in the legal regulation of individual links.

\*Ye. B. Kubko and A. Ya. Pilipenko, "Sovershenstvovaniye Khozyaystvennogo Mekhanizma v Kapital'nom Stroitel'stve. (Organizatsionno-Pravovyye Voprosy) [Improving the Economic Mechanism in Capital Construction. Organizational and Legal Problems]. Kiev, "Naukove dumka", 1983, 206 pp.

The legal aspects of further improving the planning system which are applicable to phases of the investment process are covered in the second chapter of the book. This group of problems is particularly pressing in connection with the still inadequate level of legal safeguards for planned work in the area of capital construction.

In a monograph, we find justification for conclusions and recommendations for methods of legally safeguarding the principle of stability in five-year and yearly plans for capital construction (pp 55-58), and for determining the legal significance of maintenance and procedures of such forms of planning as control figures (p 59), plan drafts, and enterprises' and associations' counter-plans (pp 62, 64-66, 68). Measures are proposed for improving the legal system for planning state capital investments and limits for construction and installation operations (p 79, ff), and for planning surveys and construction production (p 106, ff).

The regulatory functions of basic legal forms for drafting a planning estimate or a construction operation are analysed, as, in fact, are the regulatory functions of forms for five-year and yearly plans for capital construction, counter-plans, inventory and itemised lists, plans for projected products, for commodity output production etc. This planning work is now regulated by a large number of standardizing documents, the main points of which are not always mutually coordinated or in agreement, and that is why this combined analysis has not only theoretical, but concrete significance. It would be extremely interesting, in this particular section of the monograph, to analyse the causes suggested by the author which hinder the development of a "unified capital construction planning act" (p 38). Nor, regrettably, has anything been said about a new legal procedure for planning a construction procedure, or contract operations.

In the book, the provision of financing and credit for carrying out construction is considered the most important direction in the functioning of the economic mechanism in capital construction. The investigation of efficient forms of financing and credit is not reserved for the overall formulation of the problem of introducing them into the practice of management, but leads to specific proposals for centralizing the functions of financing and credit. The basis for the variation in competence in the organizing and utilizing of economic incentive funds in a construction association and in its production units also deserves attention.

In analysing the practice of the function of construction associations, neither to the authors retreat from the debatable questions, and they suggest solutions for them. This concerns, for example, the legal nature of brigade contract relations. The author's [Ye. B. Kubko's] interpretation of them as administrative-legal and labor relations, in our opinion, is not borne out by the legal essence of a brigade contract agreement (an agreement for the completion of a production assignment) as a specific legal form. According to the Statute on the Integral Process Production Brigade Construction Contract of 10 February 1983, the subject, the content and the subjective make-up of contractual relations of this type, and also the function of a brigade contract agreement as a legal form of special intra-economy relations make justifiable the belief that they are similar to regulation by economic-legal contracts.



The division of the monograph, which is dedicated to construction associations and organizations of the basic administrative link (Chapter 1, paragraphs 3 and 4), is distinguished by its immediate practical purposefulness. Using the common statutes of administration theory as a starting point, the authors have succeeded in separating the fundamental elements of the administrative system of these organizations quite accurately, and have shown ways and means of improving the administrative apparatus. Not only do the authors substantiate the progressive nature of such construction organizations as, for example, construction and installation production associations, but they also come up with specific suggestions for improving legal regulation, among which the proposal to adopt special statutes concerning the production unit of construction and installation production associations deserves attention. At the same time we notice that the authors' reasoning is often based on the practice of the activity of a number of the UkSSR's construction ministries, and on an analysis of the local legal documents from Ukrainian construction organizations, which lends persuasiveness to the material presented, even though one cannot agree with all their wishes.

It should be mentioned that a number of organizational and legal forms for improving the economic mechanism in capital construction--the legal organization of economic means and stimuli, the mechanism of standards and prices for estimates, methods of evaluating the results of industrial activity of the participants of the investment process--are not touched upon in the work under review. Nor do they indicate the role of the industry agreement as a tool for the planning and legal organization of design and estimation and construction work. That is why further research into this urgent and complicated national economic problem is needed.

Written on a high theoretical level, the monograph on the organizational and legal problems of improving the economic mechanisms in construction is, in fact, the first combined investigation of the problem in juridical literature. This establishes its importance for the theory of the economic mechanism, and for the further improvement of legal regulation of capital construction.

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## INDUSTRIAL CONSTRUCTION

### RESEARCH ON EARTHQUAKE-RESISTANT INDUSTRIAL STRUCTURES VIEWED

Tashkent PRAVDA VOSTOKA in Russian 28 Sep 84 p 3

[Article by A. Kuzanov, chief, Board of Scientific Research and New Equipment of UzSSR Gosstroy: "We Are Waiting for Suggestions"]

[Text] I have read with interest the article by Doctor of Technical Sciences K. Abdurashidov and Candidate of Technical Sciences N. Tuychiyev, entitled "Optimally and Reliably"--concerning the problems of earthquake-resistant construction--as published on 17 July. The authors of this article have raised topical and important questions, on the solution of which depends, to a large extent, on the successful and effective development of capital construction. However, I would like to take exception to the assertion that projects concerned with raising the level of earthquake-resistant construction are insufficiently coordinated and that we must develop a comprehensive, targeted program, which, as a result, will provide this republic's cities and settlements with the most effective earthquake-resistant buildings.

The program for developing earthquake-resistant construction began to function in this republic as far back as the 10th Five-Year Plan. Taking part in its creation were institutes of the UzSSR Academy of Sciences, the republic's Gosstroy, and other departments and ministries. They carried out a considerable amount of work on seismic districting and micro-districting, determining soil characteristics, and the conditions for the optimal deployment of construction projects on the territory of Western Uzbekistan.

During the 11th Five-Year Plan this program was developed, and it encompassed an even wider range of problems.

Thus, the Seismological Institute of the UzSSR Academy of Sciences, based on theoretical and full-scale, in situ studies which it carried out, for the first time compiled maps of the critical density of the seismogenic faults on the territory of Eastern Uzbekistan, worked out an optimal complex of geological, seismological, and geophysical studies, and drew up methodological recommendations regarding the detailed seismic districting of Eastern Uzbekistan.

Other colleagues have studied the dynamic reactions of the Charvak Dam to the seismic actions of earthquakes in the local fault zones, using the automated system of the engineering seismographic service. They have also studied the physical-mechanical indicators and properties of the regional types of soils and worked out forecasts of the flooding of the built-up territories by ground waters. They have conducted research on the new structural components of earthquake-resistant buildings, taking into account the actual properties of the materials, the characteristics of the seismic actions, and the engineering analysis of the consequences of earthquakes.

Based on these studies, a number of republican, normative documents have been worked out with regard to seismic planning and construction, and the task of planning experimental projects has been assigned.

Also in preparation are recommendations on planning and renovating low-story, rural and urban apartment houses, belong to citizens by the rights of private property, on the basis of analyzing existing standardized plans, taking into account seismic and soil conditions, as well as the properties of the local building materials and types of structural components.

The program of projects is being coordinated by the republic's Gosstroy. Taking part in it are the Institutes of Seismology and Mechanics and those of the Earthquake Resistance of Structures of the UzSSR Academy of Sciences, the TashGU [Tashkent State University], the TashPI [Tashkent Polytechnical School], the TashZNIIEP [Tashkent Zonal Scientific Research Institute of Experimental Planning], the UzGIITI [Uzbek State Institute for Scientific and Technical Research], the TashGIITI [Tashkent State Institute for Scientific and Technical Research], the Uzbek Scientific Research Institute for Planning Urban Construction, and others.

Furthermore, the UzSSR Gosstroy and other concerned organizations have developed and are carrying out the Comprehensive Program for Automating Planning Projects, which encompasses the planning institutes of republican ministries and departments, the main territorial administrations functioning within this republic. By the end of the five-year plan this will allow us to bring the level of the automation of planning work up to 15 percent.

The planning institutes have introduced packages of applied programs for the strength calculations of structural components, the automated planning of reinforced-concrete structural components, planning industrial and civil projects, as well as a complex of programs for over-all construction estimates. Herein there are provisions for the maximum observance of existing construction norms and regulations for planning the earthquake resistance of buildings and structures.

Nevertheless, implementation of the tasks and measures of this program has been complicated by a shortage of skilled specialists and technical equipment, although it has provided for the training and re-training of personnel, as well as the allocation of material and technical means.

In order to introduce completed scientific research and create an automated system of quality control for construction--a territorial, geometric, information-production system in a complex together with a system of automated

planning--a scientific research laboratory for automating the technology of geodesic projects has been organized on the base of the UzGIITI Institute.

Provisions have also been made for the participation of the Tashkent Polytechnical Institute in performing tasks with regard to working out new, industrial-type structural components and engineering methods for calculating earthquake-resistant buildings and structures, taking into account the properties of materials, the characteristics of seismic actions, engineering analysis, and the consequences of earthquakes.

UzSSR Gosstroy is waiting for specific suggestions from specialists in order to use them in further work on improving targeted planning of the development of earthquake-resistant construction.

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## AGRICULTURAL CONSTRUCTION

### GOSSTROY OFFICIAL ON FUTURE OF PREFABRICATED STRUCTURES

Moscow SEL'SKOYE STROITEL'STVO in Russian No 10, Oct 84 pp 1-3

[Article by Yu. Bukin, deputy chairman, RSFSR Gosstroy: "Increasing Industrialization of Construction of Agro-industrial Facilities"]

[Text] The further development of planning and construction of agricultural production facilities is one of the most important tasks stemming from the USSR Food Program adopted in May 1982. This is confirmed also by the constant attention given by the party and the government to questions of rural building.

The resolution of the CPSU Central Committee and the USSR Council of Ministers entitled "On Improving the Planning, Organization and Management of Capital Construction" defined a series of measures on increasing the effectiveness of construction. Therefore, at the present time our primary task is the search for new methodology of planning and building production agricultural structures for the purpose of their maximal industrialization and reduction of material expenditures.

Based on the scientific and project developments of the "MosgiproNIIsel'stroy", "TsNIIEPsel'stroy" and "BelgiproNIIsel'stroy" Institutes, as well as on the experience accumulated as a result of the experimental building of individual animal raising structures by the organizations of Glavmosoblstroy in Moscow Oblast and by a number of others, measures have been outlined for the accelerated introduction of fully prefabricated buildings in agricultural production construction.

At the initial stage, the measures provided for the development of variants of standard projects with increased degree of prefabrication and high degree of plant readiness of facings, tambours, partitions, and elements of technological function in primary and subsidiary buildings.

Their implementation makes it possible to increase the degree of prefabrication by over one-and-a-half times and to achieve a specific reduction in cement expenditure within the margins of 10-15 percent and of lumber materials by 15-20 percent, practically without increasing the cost of construction. Labor expenditures are also considerably reduced at the construction sites.

Today the second stage has already been fulfilled. A series of new standard projects for agricultural production buildings has been developed in a maximally

prefabricated variant. Brickwork and monolith foundations, as well as wall columns have been fully eliminated in subsidiary production and auxiliary buildings. Load-bearing structures of production buildings have been worked out in two mutually interchangeable variants: a frame carcass on piles, and a support-beam carcass. The walls are made of consolidated light concrete panels. Tambours are prefabricated, assembled of the same panels as the outside walls. The cover panels of the buildings are integrated, with full plant readiness; the sanitary facilities are modular, and the partitions are prefabricated. The floors in primary production buildings are prefabricated-monolith. The troughs for manure removal channels, areaways, feed bins, grids, and elements for securing turning devices (turnstiles) in manure removal transporters are all prefabricated.

At this stage, the task was set of significantly reducing the labor consumption for construction without resorting to the application of new building materials and without special re-equipment of the building industry enterprises, so that the realization of this task would be accessible to practically any building trust.

Increasing the level of prefabrication with the existing ratio of prices is associated with increasing the estimated cost of construction. In order to prevent this and for the purpose of improving the quality of standard projects, a simultaneous review was performed of the overall planning decisions of buildings, as well as the arrangement and placement of technological equipment.

Cow barns were shortened by means of changing the scheme of manure removal. The area of the milking unit was reduced by means of rational arrangement of new equipment. The feed mixing facility, the root and produce storage area, the technical service center, and the heated tractor packing area are all located in a single building block in the fodder zone.

Projects for assembly block-units for engineering and technological equipment have been developed, as well as for their rational placement at the facilities. Delivery of equipment for fully prefabricated farms in assembly block-units ensures a reduction in the labor expenditure of installers at the construction sites, as well as an increase in the quality of installation work.

The overall result of this has been a 25 percent reduction in construction labor expenditures. This was accomplished not only with no increase in the estimated cost of construction, but even with a certain reduction.

New standard projects for fully prefabricated buildings and structures of subsidiary-production and subsidiary-auxiliary function. Among these are seven projects for boiler rooms using designs of rural nomenclature. The number of standard-size schemes has been reduced to 2/5 of the previous number, the degree of prefabrication has been doubled, while the labor consumption has been reduced by 20-25 percent.

The introduction of new projects for transformer substations made of reinforced concrete panels with bolt connections brings the degree of prefabrication to 88 percent and reduces the construction time to 1/2 the previous amount.

Unfortunately, the mass application of the indicated developments is still far from universal. Often the project planners are led by the builders, who allude to the absence of appropriate capacities of construction industry bases. Practical experience has shown that the organization of additional output of constructions and products to increase the level of prefabrication of buildings and structures requires only attention and good management. The material expenditures are small and quickly pay for themselves.

The project planners should not stop at what they have achieved. Buildings of subsidiary-auxiliary function still have great variation in height, which leads to an increase in the nomenclature of columns, wall panels and partitions. Enclosure structures for all types of animal husbandry facilities, carpentry products, etc. all require unification.

Recently, reinforced concrete triple-hinged frames have found widespread application in agricultural construction. Their introduction reduces the labor consumption of construction-installation work. The inside space is not cluttered with supports, as is the case with the support-beam carcass. Such a building is easier to adapt to any technology (KRS [not further expanded], hog raising, poultry raising), and to re-equip if necessary. This is particularly important in the reconstruction and expansion of small farms and complexes.

However, the existing standard frame designs also have a number of shortcomings. As a rule, they are all the same height (2.4m) and have low transportability. During their manufacture it is necessary to build individual steam-curing chambers and individual casing for each type of frame.

This has forced project designers to seek new solutions.

The most successful of these are the split frame designs, consisting of two straight elements—stands and cross bars. These have been developed by the RosgiproNII sel'stroy Institute in conjunction with the USSR Gosstroy NII ZhB [Scientific-Research Institute on Reinforced Concrete] with participation of the Pskov oblast Interkolkhoz construction association.

The adopted parameters of stands and cross bars consider all the variations of the overall-planning decisions for agricultural buildings of production function, as well as for auxiliary buildings.

The elements of the frame constructions are standardized, which makes it possible to mold the stands and cross bars of various spans and heights in the same casing molds. Construction experience has confirmed their high transportability and ease of installation. They are up to 20 percent more economical than the traditional types in terms of concrete, up to 7 percent in terms of steel, and 3-4 percent in terms of labor expenditures.

Already in 1984-1985, up to 50 agricultural buildings of various function will be built using these designs in Pskov and Moscos Oblasts.

We must also mention other promising directions for further industrialization of rural construction and reduction of labor expenditures in erecting buildings and structures.



Frame-panel constructions (covering slab unified with the wall panel) are being tested in Vladimir Oblast, and arch-casings—in Leningrad Oblast. The advantage of such constructions, which simultaneously fulfill the function of a wall with covering and roof, is their 20-25 percent economy of reinforced concrete, the possibility of manufacturing whole fully prefabricated building elements under plant conditions, and their rapid installation at the construction site.

The Pskov Inter-Kolkhoz Construction Association has organized the manufacture of thin-walled strong reinforced cement "shells", which are installed in pairs and form arch structures.

In Krasnodar Kray, kolkhoz builders are working on the mass introduction of integrated light concrete slabs with top ribbing.

The Klin'sk Agricultural Building Combine of Glavmosoblstroy [Construction in Moscow Oblast Main Administration] is changing over to the production of polystyrene-concrete wall panels of increased plant readiness. These were developed by the TsNIIÉPsel'stroy [Central Scientific-Research and Project Design Institute on Standard and Experimental Design of Agricultural Construction] and the NIIZhB, and are noted for their simplicity of manufacture and high resistance to heat exchange.

Arbolite wall panels are widely used in Gorky and Saratov Oblasts. This makes it possible to utilize cheap local materials without reducing the degree of prefabrication.

Industrialization has also touched the building of sewage, water supply and heating supply facilities.

MosgiproNIIsel'stroy and the Inzh'sel'stroy Combine have developed projects for biological purification stations with productivity of from 25 to 700 m<sup>3</sup>/day and comprised of fully prefabricated elements. At the present time, over 200 such stations have been built in the rayons around Moscow. They compare favorably with the traditional ones: the estimated cost of construction is reduced by 20-25 percent, while the labor expenditures at the site are only 1/5 to 1/7 the previous amount. Also, the area of development is reduced.

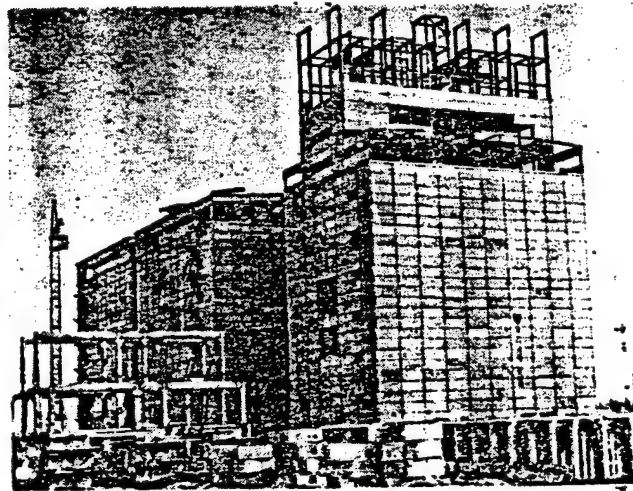
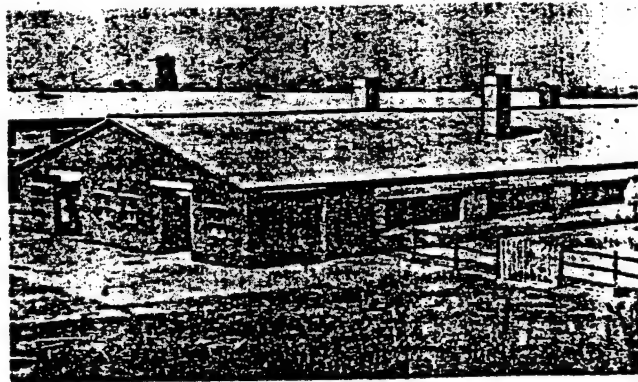
In Moscow Oblast, projects for water towers with height of 19 and 24m and with shafts made of prefabricated reinforced concrete rings and tank capacity of 50 and 150 m<sup>3</sup> have found widespread application. As compared with the traditional brick variant, the new design towers make it possible to utilize only 5/14 the labor expenditures and to complete building in only 5/32 of the time.

Boiler installations made of prefabricated constructions with installation of equipment and pipelines in large plant-manufactured modules are 10 percent cheaper than those built previously, while labor expenditures for building them have been reduced to 1/2 to 1/2 the previous amount.

Nevertheless, the transfer of the center of gravity in construction to the deep-seated rayons of oblasts, Krays and ASSR where there is an absence of good roads and bridges not only reduces the profitability of building production, but also becomes a barrier in the path of industrialization.



Under such conditions, a prefabricated tambour, a transformer substation or other consolidated building elements cannot be delivered to the facility. Difficulties arise in the rhythm of deliveries and installation. A number of jobs associated with treating or finishing constructions at the plant lose their meaning. Therefore, it is necessary to seek out other means of reducing labor expenditures.



Complex for raising calves at the Kolkhoz imeni Lenin of Saratov Oblast. Lower photo -- construction of silo structures and operating elevator tower at the Verda Station in Ryazan Oblast.

One of these [new methods] may be the turn toward monolith reinforced concrete with the use of various pneumatic casings.

The application of re-usable lightweight concrete forms which are blown up with air to give them rigidity in combination with the new technology in

concrete placing work for building spatial structures make it possible to perform concrete work on entire structures at the construction site, attaining high technical-economic indicators. This method of construction requires a very low expenditure of materials, since the constructions are given singular or double curvature which is advantageous from the standpoint of their operation. The equipment used for concreting, including the uninflated pneumatic forms, are easily transported by truck and quickly assembled at the construction site. It is simple to manufacture and low in cost.

In this method of construction there is no need to create a large production base for the manufacture of prefabricated reinforced concrete elements, and work can be conducted anywhere, regardless of the condition of motor vehicle roads.

The forms here are the inflated pneumatic casings which are laid out on a horizontal base. Successive layers of lining, heat-, thermal- and hydro-insulation, reinforcement and concrete mixture are placed over the form.

The RosgiproNIIsel'stroy Institute has already developed a project for a universal building with dimensions of 12x36x6m built by the pneumatic form method. The variant of such a building for storing mineral fertilizers reduces the estimated cost by 39 percent and reduces the labor expenditures to 1/2 that of the standard project.

Considering all the information presented above, it is possible to make the following step in the direction of improving standard projects by means of selection and experimental testing of the most progressive building and technological solutions.

Such an experiment is to be implemented at the Korobovo Experimental Farm under the Smolensk branch of the Moscow Agricultural Academy imeni K. Ye. Timiryazev. A cow barn, pig farm, repair yard, poultry farm, grain chute, potato and vegetable storage facility, and warehouse buildings will be built.

A minimal number of overall-planning parameters, constructions and structural elements will be used in building these facilities. Effective building materials and consolidated products of high plant readiness will be used to a maximal degree. New proposals on the rational placement of equipment will be tested, with development of methods for complex-unit installation. Technological decisions will be subjected to comprehensive evaluation and tied in with the task of developing buildings with multi-purpose function.

Thus, a wide-scale comprehensive experiment will be performed, whose end goal is to maximally increase the labor productivity of builders as well as agricultural workers. As a result, the most progressive decisions will be defined and subsequently embodied in the standard projects for agricultural construction in the 12th Five-Year Plan.

Here we must remember that full prefabrication and industrialization of construction of agricultural production buildings is not a goal in itself.

Such an approach would lead to a significant increase in the cost and material consumption of agricultural facilities. Consequently, in developing new model projects for fully prefabricated buildings, aside from the design decisions, it is also necessary to thoroughly review the technological, overall-planning, sanitary technical and other decisions which have been made in previous projects for the purpose of reducing construction labor expenditures as well as the overall estimated cost of the facilities.

We must already today orient the production base toward the development and organization of output of structures made of lightweight concrete, arbolite, gypsum, and asbestos cement. The application of dry plastering, cement-wood fiber panels, and rigid mineral wool panels, asbestos cement products and constructions manufactured by the extrusion method, as well as others, will find widespread application.

The introduction of achievements of scientific-technical progress into construction must ensure an increase in the effectiveness of capital investments on the farm, as well as the creation of a strong production base for the entire agro-industrial complex. This task was stressed at the All-Union Economic Conference on Problems of the Agro-Industrial Complex held in the Kremlin in March 1984.

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## AGRICULTURAL CONSTRUCTION

### REVIEW OF RURAL CONSTRUCTION IN LATVIA UNDER RAPO

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 11, Nov 84 pp 22-36

[Article by A.A. Kalnynsh, Institute of Economics of the Latvian SSR Academy of Sciences: "Organization of Rural Construction Under Conditions of the Agroindustrial Complex"]

[Text] The fulfillment of state plans for production and purchases of agricultural products is closely connected with the envisaged startup of capacities of production capital in crop growing, productive-livestock farms, feed shops, machine shops and the like and with carrying out of their reconstruction and modernization. The total amount of capital investment (state and kolkhoz) for the development of agriculture for the entire complex of work in Latvian SSR for the period 1956-1965 comprised annually on the average 97 million rubles, for 1966-1975--267 million rubles, for 1976-1980--347 million rubles and for 1981-1982--330 million rubles. In recent years, serious structural changes were also carried out in allocation of capital investment. Priority is given to strengthening the material and technical base of farming and fodder production, housing, cultural and personal services and road construction.

For the purpose of more reliable fulfillment of the tasks of the food program in the future, a number of problems should be solved in rural construction. And here first of all, we should point out the still inadequate rate of strengthening and expansion of the material and technical base of rural construction organizations and consequently of their capacities in Latvian SSR. The data in Table 1 show that the volume of construction and installation work performed for agriculture by interkolkhoz construction organizations {MSO} in 1983 compared with 1976 increased by only 18.3 percent, while mobile mechanized columns (PMK) of the Latvian SSR Ministry of Construction even reduced it by 10.4 percent. It is good that this decrease was compensated by growth of construction and installation work carried out by kolkhozes' and sovkhoses' individual means. Moreover, it is characteristic that the percentage of fulfillment of the plan of construction and installation work is as a rule lower for the mobile mechanized columns of the Ministry of Construction than for interkolkhoz construction organizations, especially when compared with kolkhozes' and sovkhoses' individual means. Whereas the volume of construction and installation work for agriculture was fulfilled on the average 98 percent during 1975-1983, fulfillment by mobile

mechanized columns of the Ministry of Construction amounted to only 80 percent, by Latvskolkhozstroy--87 percent and by individual means--123 percent (see Table 1). In recent years (1981-1983), this situation has improved somewhat: the plan as a whole was fulfilled 105 percent, mobile mechanized columns fulfilled the plan 86 percent, interkolkhoz construction organizations--92 percent and with individual means--135 percent.

The inadequate development of the material and technical base of agriculture in Latvian SSR is shown by the fact that the rate of capital investment to a certain extent lags behind similar indicators in neighboring republics. Thus capital investment of the state and kolkhozes in agriculture for the entire complex of work per hectare of agricultural fields as a whole for 1976-1980 in Latvian SSR amounted to 829 rubles and in Lithuanian SSR amounted to 973 rubles, or 17.4 percent more. Whereas on the average the amount of aggregate capital investment during 1956-1965 in Latvian SSR's agriculture amounted to 77 percent of the total level of corresponding capital investment in Lithuanian SSR, during the period of 1976-1980 this indicator dropped to 59 percent, or 18 points. It is possible to reach similar conclusions when comparing corresponding indicators in Estonian SSR.

At the December (1982) Plenum of the Central Committee of the Communist Party of Latvia, it was pointed out that it is necessary to direct heads of construction ministries and departments to the very necessary growth of the capacities of rural construction organizations and to priority fulfillment of construction plans in rural localities. Rural construction "...is one of the controlling conditions of operation of the agroindustrial complex and successful realization of the food program,"<sup>1</sup> but it was emphasized at the plenum that growth of capacities of construction and installation organizations was slow in being carried out at the Ministry of Construction, at Latvskolkhozstroy Association and at the State Committee for Selkhoztekhnika and that the Ministry of Construction Materials Industry had failed to provide a large quantity of brick, cement and crushed stone.

The construction and startup of new production capital constitute a significant basis for further development of production. The data of Table 2 are specific evidence of this. For example, cost of growth of fixed production capital computed per 100 hectares of agricultural land in 1980 compared to 1965 increased 3.8-fold, that is, at a minimum rate compared to Lithuanian SSR and Estonian SSR. Correlations were also similar for the rate of increase of gross agricultural production (1976-1980 vis-a-vis 1966-1970). Furthermore, while the cost of fixed production capital per unit of area in 1965 was higher in Latvian SSR than in the neighboring republics, in 1980, on the other hand, it was the smallest.

A tendency has appeared for accelerated expansion of construction by means of initiative individual means at kolkhozes and sovkhoses. And it is still worse that this usually takes place through expansion of this type of construction solely at isolated agricultural enterprises of one rayon or another. In the future it would be advisable to correct such an unfavorable strategy for developing the material and technical base of rural construction.

It should be pointed out in this connection that the capacities of interkolkhoz construction organizations, for example, in Estonian SSR, are higher than in Latvian SSR, although the amount of agricultural land and the volume of produced agricultural production are greater than in Estonian SSR (see Table 2). The volume of contract work computed per hectare of agricultural land performed with the individual means of interkolkhoz construction organizations in 1982 amounted to 28 rubles in Latvian SSR and 73 rubles in Estonian SSR, or 2.6 times as much. At the same time, it should be noted that the actual level of organization of construction and installation work in Estonian SSR is somewhat higher, which is also shown by Table 3.

The accomplishment of a large portion of construction and installation work in the countryside by Estkolkhozstroy Association is assured from year to year by growth of construction capacities and increased output of construction materials of one's own production: reinforced-concrete and concrete parts, [\*\*] silicate-containing [silikattsitnyye] parts, electrical materials, ventilation installations and others. This makes Estkolkhozstroy Association to a certain degree independent of other departments and ministries; it makes it possible to independently solve construction problems in rural localities and to effectively reorganize it in necessary cases.

As has already been indicated, construction through the individual means of the republic's kolkhozes and sovkhoses has increased in recent years. Moreover, it is characteristic that a big polarization is to be found here among individual agricultural enterprises (see Table 4). In 1981, on 114 agricultural enterprises, or on 22 percent of the total number of farms, construction and installation work was completed amounting to 29.7 million rubles, or 72 percent of the total volume of individually accomplished construction and installation work of all of the republic's agricultural enterprises. At 9 kolkhozes (Adazhi of Rizhskiy Rayon, it amounted to 1.5 million rubles, at Nakotne of Yelgavskiy Rayon--1.1 million rubles, at Uzvara of Bauskiy Rayon and Straume of Salduskiy Rayon--0.6-0.7 million rubles, at Kekava Kolkhoz--0.5-0.6 million rubles) and at 2 sovkhoses (imeni XXV S'Yezd KPSS of Yekabpilsskiy Rayon--1.7 million rubles and Malpilsskiy Sovkhoz-Tekhnikum of Rizhskiy Rayon--0.7 million rubles), construction and installation work was performed amounting to almost 10 million rubles, which constituted 23 percent of the total volume of independently performed work at the republic's agricultural enterprises. At 136 kolkhozes and sovkhoses in 1981, in general construction and installation work by individual means was not performed.

The data cited in Table 4 show that the volume of construction and installation work of one or another agricultural enterprise accomplished through individual means depends only slightly on the amount of agricultural land turned over for its disposal. But its volume correspondingly grows sharply per hectare of agricultural land, and so does its relative share in the total volume of construction and installation work. At the same time the volume of construction and installation work performed by contracting specialized construction organizations per hectare of agricultural land has not decreased (in groups I-IV about 30-40 rubles and in groups V-X about 30-45 rubles).

Table 1. Fulfillment of Plan of Construction and Installation Work for Latvian SSR Agriculture in 1976, 1983. Millions of Rubles  
[Left side of table]

ИТЕЛЬСТВА (с)		(d) «Латвколхозстрой»		(e) Хозяйственным способом		
выполнение, (h)	план (f)	выполнение (g)	выполнение, (h)	план (f)	выполнение (g)	выполнение, (h)
7	8	9	10	11	12	13
74	16,9	14,5	86	19,4	20,2	104
76	12,2	9,8	81	24,0	27,3	113
74	15,0	10,2	68	23,0	25,8	112
87	16,4	14,3	87	21,7	29,4	136
70	17,8	15,7	88	25,1	29,8	119
77	17,8	15,4	87	21,9	25,9	118
88	20,7	20,0	96	22,7	28,9	127
92	19,3	19,5	101	21,8	25,8	118
76	78,3	64,5	82	113,2	132,5	117
86	57,8	54,9	95	66,4	80,6	121
80	136,1	119,4	88	179,6	213,1	119
87	41,6	37,9	91	17,5	20,6	118
94	45,0	39,4	87	21,0	23,6	112
70	43,8	35,0	80	27,4	31,9	116
257	44,9	36,9	83	31,8	34,9	109
77	46,6	37,0	79	29,5	36,1	123
110	41,9	38,2	91	24,5	32,1	133
99	42,2	38,0	90	23,1	36,1	156
86	45,7	42,5	93	24,2	37,5	155
95	221,9	186,2	84	127,2	147,1	116
100	129,8	118,7	91	71,4	105,7	148
96	351,7	304,9	87	198,6	252,8	127
75	58,5	52,4	90	36,9	40,8	111
77	57,2	49,2	86	45,0	50,9	113
79	58,8	45,2	77	50,4	57,7	114
91	61,3	51,2	84	53,5	64,3	120
71	64,4	52,7	82	54,5	65,9	121
79	59,7	53,6	89	46,1	58,1	126
88	62,9	58,0	92	45,8	65,0	111
91	65,0	62,0	95	46,0	63,3	138
77	300,2	250,7	84	240,3	279,6	116
86	187,6	173,6	92	137,9	186,4	135
80	487,8	424,3	87	378,2	466,0	123

Key [to both sides of table]:

- a. Category of farms and years
- b. Total
- c. Ministry of Construction
- d. Latvikkolkhozstroy
- e. With individual means
- f. plan
- g. fulfillment
- h. fulfillment, %

- i. State farms
- j. As a whole for
- k. Kolkhozes
- l. Total
- m. Based on data of Main Administration of Capital Construction of Latvian SSR Ministry of Agriculture



Table 1. (Continued)

[Right side of table]

(a) Категория хозяйств и годы	(b) Всего			(c) Министерство стро-	
	план (f)	выполнение (g)	выполнение (h)	план (f)	выполне- ние (g)
1	2	3	4	5	6
<b>Государственные хозяйства</b>					
(i) 1976	84,6	72,8	86	38,3	28,5
1977	74,8	66,2	88	35,5	26,9
1978	74,9	63,7	85	34,4	25,4
1979	74,6	79,9	107	33,3	28,9
1980	75,9	68,5	90	29,7	20,9
1981	69,0	64,6	93	26,6	20,6
1982	76,5	77,7	101	30,1	26,5
1983	73,4	74,4	101	29,6	27,1
(j) В целом за 1976—1980	384,8	351,1	91	171,2	130,6
(j) В целом за 1981—1983	218,9	216,7	99	86,3	74,2
(j) В целом за 1976—1983	603,7	567,8	94	257,5	204,8
<b>(k) Колхозы</b>					
1976	63,8	63,4	99	3,0	2,6
1977	68,4	65,6	96	1,8	1,7
1978	73,7	69,2	94	1,4	0,9
1979	78,8	79,9	107	0,7	1,8
1980	80,4	77,0	96	3,0	2,4
1981	68,0	72,9	107	1,2	1,4
1982	67,7	76,1	112	1,3	1,2
1983	72,7	82,8	114	0,8	0,7
(j) В целом за 1976—1980	365,1	355,1	97	9,9	9,4
(j) В целом за 1981—1983	208,4	231,8	111	3,3	3,3
(j) В целом за 1976—1983	573,5	586,9	102	13,2	12,7
(l) Всего:					
1976	148,4	136,2	92	41,3	31,1
1977	143,2	131,8	92	37,3	28,6
1978	148,6	132,9	89	35,8	26,3
1979	153,4	159,8	104	33,7	30,7
1980	156,3	145,5	93	32,8	23,3
1981	137,0	137,5	100	27,9	21,9
1982	144,2	153,8	107	31,4	27,7
1983	146,1	157,2	107	30,4	27,8
(j) В целом за 1976—1980	749,9	706,2	94	180,9	140,0
(j) В целом за 1981—1983	427,3	448,5	105	89,7	77,4
(j) В целом за 1976—1983	1177,2	1154,7	98	270,6	217,4
(m) * По данным Главного управления капитального строительства Министерства сельского хозяйства Латвийской ССР.					

Growth of the volume of construction and installation work done by individual means also has a positive influence on felling of timber. On farms where the volume of construction and installation work is below 100,000 rubles per year, there is 15-20 percent less timber from one hectare than on farms with a higher level of construction and installation work.

Some effective indicators (gross agricultural output per 100 hectares of agricultural land and one worked man-hour) support the fact that it is more

advantageous to attain a volume of construction and installation work of not less than 100,000 rubles per year by individual means. This has an

Table 2. Dynamics of Capital Investment, Fixed Production Capital and Gross Production in Agriculture of the Individual Republics

Indicator	1966-1970	1976-1980	1976-1980 compared to 1966-1970
Capital investment in agriculture, billions of rubles			
USSR	81.5	171.0	210
Lithuanian SSR	1.8	3.5	194
Latvian SSR	1.2	2.1	175
Estonian SSR	0.8	1.4	175
Cost of agricultural fixed production capital per 100 hectares of agricult- ural land on kolkhozes, sovkhoses and interfarm agricultural enterprises, thousands of rubles <sup>2</sup>			
USSR	10.2	39.4	386
Lithuanian SSR	31.4	165.7	527
Latvian SSR	36.8	141.8	385
Estonian SSR	33.6	153.1	456
Average gross agricultural production per year, billions of rubles			
USSR	100.4	123.9	123
Lithuanian SSR	2.2	2.6	118
Latvian SSR	1.4	1.6	114
Estonian SSR	0.8	1.1	138

1. MEZHDUNARODNIY SEL'SKOKHOZYAYSTVENNIY ZHURNAL, No 6, 1982, pp 15, 17.
2. Cost of fixed production capital given in first column is for 1965 and in second column--for 1980.

especially favorable effect when the volume exceeds 400,00 rubles in a year. Moreover, it should be noted that during 1975-1981 a polarization took place in carrying out of construction and installation work by individual means at agricultural enterprises of Latvian SSR. Whereas in 1975, the relative share of kolkhozes and sovkhoses doing no construction and installation work amounted to 19.4 percent, in 1981 it increased to 26 percent. With respect to those performing construction and installation work of up to 100,000 rubles per year, the figures were respectively 62.2 percent and 52.1 percent, from 100,000 to 200,000 rubles per year--11.7 percent and 13.8 percent and in excess of 200,000 rubles per year, in 1975--6.7 percent and in 1981--8.1 percent of the total number of farms. For those agricultural enterprises

which in 1975 had a volume of construction and installation work carried out by individual means of more than 150,000 rubles in a year, capacities were

Table 3. Volume of Work Performed by Interkolkhoz Construction Organizations in Latvian SSR and Estonian SSR in 1960-1982<sup>1</sup>

Indicator	1980				1981				1982			
	LaSSR		ESSR		LaSSR		ESSR		LaSSR		ESSR	
	2	3	4	5	6	7	8	9	10	11	12	13
1												
Volume of contracting work performed by interkolkhoz construction organizations' own efforts, millions of rubles	67.8	105.7	1.56	67.1	107.6	1.60	69.2	109.7	1.58			
Fixed capital, millions of rubles	155.1	182.1	1.17	158.8	198.3	1.25	165.2	212.3	1.28			
Establishment average number of personnel, thousands of persons	15.0	19.7	1.31	15.0	20.1	1.34	14.9	20.2	1.35			
Profit, millions of rubles	4.3	24.1	5.60	5.5	24.2	4.40	10.1	19.0	1.88			

1, "Narodnoye khozyaystvo SSSR v 1980" [USSR National Economy in 1980]. USSR Central Statistical Administration. Statistical yearbook. Moscow, Finansy i statistika, 1981, p. 269; "Narodnoye khozyaystvo SSSR v 1982" [USSR National Economy in 1982]. USSR Central Statistical Administration. Statistical yearbook. Moscow, Finansy i statistika, 1983, p. 281.

further increased. At the same time, the number of farms where no construction and installation work was by independent means grew from 118 in 1975 to 136 in 1981.

It should be considered a definite defect that agricultural construction is split up among separate departments. Construction on kolkhozes and state farms of the Latvian SSR Ministry of Agriculture is done by contracting organizations of the Latvian SSR Ministry of Construction (in 1983, 17.7 percent of the total volume of construction and installation work was completed and in 1976--22.8 percent), by the Republic Latvskolkhozstroy Association of Interkolkhoz Construction Organizations (in 1983--39.4 percent and in 1976--30 percent) and to an insignificant degree by organizations of other departments. The extremal values of the relative share of contracting work in individual rayons differ by a factor of 2-3 from the average indicated indicators for the republic.

The Latvian SSR Ministry of Construction carries out construction in rural localities with the resources of 7 trusts and 20 mobile mechanized columns. The only rural construction organization in its system is the Bauskaya Mobile Motorized Column, which does construction work both on state farms and also on kolkhozes of the rayon. In two rayons (Talsinskiy and Baiskiy) all construction is done with the resources of interkolkhoz organizations for all clients on the territory of the rayon. Interkolkhoz construction organizations exist in all rayons with the exception of Bauskiy Rayon. There is a total of 29 interkolkhoz construction organizations, including 3 specialized ones.

Separate operations (construction of roads, bridges and setting up of platforms is done by 11 road-building administrations (DSU) and road repair-and-building administrations (DRSU, in each rayon) of Latavtodormost Trust of the Latvian SSR Ministry of Motor Transport and Highways. Of the total amount of contracting work of Latavtodormost Trust, about 5 percent is allotted for agriculture.

The power-construction trust of Latglavenergo Main Production Administration of Power and Electrification of Latvian SSR carries out with the resources of the power-construction trust electrical installation work at agricultural facilities for all rayons and general contracting organizations. Of the total volume of contracting work, about 35-40 percent is done for the needs of agriculture. Rural electrification work is done by 6 mobile mechanized columns located in Talsinskiy, Yelgavskiy, Valmiyerskiy, Ogrskiy, Aluksnenskiy, Daugavpilsskiy and Rezeknenskiy rayons. Mobile mechanized columns have operational sectors in all the rayons.

The Latvian SSR State Committee for the Supply of Production Equipment for Agriculture carries out with the resources of Latspetsssel'montazh Trust work relating to the installation of technological equipment and metal structures and organization of external technical communications and sanitary-engineering work. The trust has a mobile mechanized column or a cost accounting sector in each rayon.

Table 4. Description of Accomplishment of Construction and Installation Work at Latvian SSR Agricultural Enterprises

Farm groups	Farm groups by amount of performed const.-install. work by own means, thousands of rubles	Number of farms in group	Average area of agricultural land per farm, hectares	Const.-install. work performed per hectare of agricultural land		Timber felled per 100 hectares of forested area in cubic meters	Produced gross agricultural production per hectare of agricultural land, rubles	Gross agricultural output produced per man-hour, rubles
				total, rubles	by own method, rubles			
I	Does not do this	136	3,916	44	--	--	403	2.48
II	To 25	85	4,213	33	3	10	374	2.55
III	26-50	92	4,361	38	9	23	303	2.51
IV	51-100	95	4,228	47	17	36	403	2.64
V	101-150	46	4,464	57	27	48	488	2.83
VI	151-200	26	4,993	86	38	45	551	3.07
VII	201-300	16	4,846	82	50	61	643	3.74
VIII	301-400	9	4,584	118	75	63	677	3.37
IX	401-500	6	4,470	140	99	70	1,007	3.97
X	More than 500	11	5,124	214	169	79	1,113	4.38

Moreover, the Latvian Ministry of Communications with the help of two specialized mobile columns carries out operations of setting up telephonic and radio communications for rural facilities. The Main Administration for Gazification under the Latvian SSR Council of Ministers by means of Spetsstroygaz Installation Administration does work on the construction of gas medium- and low-pressure gas lines as well as internal installation of gas in buildings built by individual means and partially with the aid of Latvkolkhozstroy. The Geology Administration attached to the Latvian SSR Council of Ministers drills artesian wells.

In addition, a certain amount of construction and installation work is done in other sectors of the agroindustrial complex: by the Latvian Production Repair and Construction Administration of Soyuzelevatormel'remstroy Trust of the USSR Ministry of Procurement, by the Riga Specialized Installation and Adjustment Administration of Soyuzmyasomol'montazh Trust of the USSR Ministry of Meat and Dairy Industry, by the specialized installation administration of Latrybprom [\*\*]Production Association of [\*]VRPO [All-Union Fish Production Association] of the USSR Ministry of Fishing Industry, by repair and construction administrations of the Latvian Ministry of Food Industry and by Latkoopstroy'montazh Trust of the Latvian SSR Consumer Union. Twenty-nine mobile mechanized columns of the Ministry of Land Reclamation and Water Resources perform specific wide-scale construction work.

In a number of cases, separate construction organizations in an administrative rayon create parallel production bases with their concrete-mortar units, shops and areas for the production of reinforced-concrete products, carpentry shops, sawmills, machine repair shops and quarries for the extraction of nonmetalliferous materials. As a rule, a rayon has 4 to 10 auxiliary bases (of Latvkolkhozstroy, Ministry of Construction, Ministry of Water Resources, Ministry of Land Reclamation and Water Resources, Ministry of Motor Transport and Highways and so on), not counting such units at the republic's kolkhozes and sovkhoses.<sup>2</sup> At the same time, specialized construction equipment is being acquired which in view of the small volume of construction by individual organizations or lack of completeness of their deliveries cannot be maximally productively used. In a number of cases, it exists in limited quantities. Unjustified cross shipments of construction materials are also observed. Besides each ministry or department engages as a rule in further development and expansion of its auxiliary enterprises without sufficient mutual coordination and consideration of the common interests of the rayon.

Small construction organizations increasingly frequently make use of the services of external units for carrying out specialized work (sanitary engineering, installation and adjustment of technological equipment and others). The creation of an increasingly larger number of external units results in impairment of the technology of production. In this connection, general contractors do not possess either adequate material-incentive measures or economic sanctions in regard to subcontractors, which does not allow general contracting organizations to provide coordinated work.

It would be most advantageous for technological specialization to be developed within the framework of a single department. For example, the work

achievements of Rezeknenskaya Interkolkhoz Construction Organization and several others are to a significant degree to be explained by the fact that interkolkhoz construction organizations themselves have sectors concerned with installation of equipment, carrying out of sanitary engineering work and the like for performing basically with their own means a whole complex of operations. It is frequently difficult to coordinate the work of a number of even small specialized organizations of one department.

Furthermore, Rezeknenskaya Interkolkhoz Construction Organization is developing a production base calculated both for the needs of rural establishments engaged in construction and capital repair with their own means. At the present time, kolkhozes and sovkhoses of the rayon turn over funds to interkolkhoz construction organizations for cement and lumber and receive adequate mortar, concrete and carpentry items. There is no need for handicraft production and people are released. Furthermore, it should be pointed out that neither Gosplan nor Gossnab are able to envisage, even with sufficiently diligent work on the part of their services, the multitude of minor items comprising the needs of construction people. For this reason it is necessary to produce a number of other necessary products for construction workers within the farmwork of their own establishments.

The methods of Rezeknenskaya Interkolkhoz Construction Organization are being increasingly more widely used by other interkolkhoz construction organizations. Thus at Daugavpilsskaya Interkolkhoz Construction Organization, a shop has been established for constructional engineering and sanitary engineering procurement, where they prepare, check and assemble everything necessary for an animal-husbandry farm or for a dwelling house. Only completing and final operations are performed at a construction site. Here they even partially assemble equipment for clients. In 1981, the sanitary-engineering work of Daugavpilsskaya Interkolkhoz Construction Organization amounted to almost 1 million rubles, roughly as much as that of Spetssel'montazh Rayon Mobile Mechanized Column of the State Committee for Selkhoztekhnika with a considerably larger administrative apparatus. In addition, an area for making reinforced-concrete products, a concrete-mortar unit, a small-scale mechanization sector, a sawmill and a carpentry shop exist here. This makes it possible to ensure efficient and steady organization of work at construction sites and to secure adherence to the technology of construction operations. Although items produced at these auxiliary production facilities sometimes cost more than under conditions of large-scale narrowly specialized production, yet labor productivity and profitability in the aggregate are high for interkolkhoz construction organizations.

Such a growth of independence, completeness and technological exclusiveness of the production cycle and the existence of one's own subdivisions have made it possible to achieve good end results. The basic element--the interkolkhoz organization with a capacity of roughly 4-6 million rubles has to include expanded complex and specialized brigades and a developed production base--a concrete-mortar unit, an area for the production of nonstandard and small-series concrete and reinforced-concrete structures, a sawmill shop, a carpentry shop, a machine repair shop, a shop for preparing finishing semimanufactures, materials warehouses and a unit for performing motor-transport work. Moreover, it is important for individual sectors of a



construction organization (the material and technical base and housing facilities) to be concentrated not only at the rayon center but also to be rationally located at certain intrarayon centers. This brings workers closer to the construction site and saves expenditures of transport and fuel.

The integrated Raysel'stroy Rayon Rural Construction Organization should have turned over for its disposal all funds for materials for construction with individual means, preparation of construction, that is, provision of documentation, equipment, equipment orders and its receipt in accordance with the orders. There has to be established a single plan of construction and installation work and capital repair for all organizations of the rayon agroindustrial complex.

In a number of cases, it will be necessary to review the feasibility of operating a large number of parallel construction organizations and to raise the level (coefficient) of technological exclusiveness of local units of administration of construction. This would make it possible to more effectively control scientific-technical progress and carrying out of a single technical policy in construction and to shift the solution of operational questions relating to the course of construction from the republic to the rayon level.

In addition, it is necessary to point out the rather complex intradepartment barriers within the limits of the Latvian SSR Ministry of Construction itself and even within the trust framework: instances are observed of overspecialization of construction work. This especially is felt by the rural mobile mechanized columns of the given ministry. The not always successful work of some mobile mechanized columns is sometimes due to the fact that subcontractors are not working sufficiently efficiently (management of mechanized construction operations, management of electrical installation work, management of sanitary engineering work and so on). It is necessary to investigate whether or not regional trusts constitute an unnecessary unit and whether mobile mechanized columns can be more effectively directly subordinated to the Ministry of Construction. For carrying out specialized subcontracting work, it is possible to form in each rayon one's own sectors which could operate at the base of the mobile mechanized column of the respective rayon.

The USSR Ministry of Rural Construction also maintains a policy of creating a mobile mechanized column in each administrative rayon. At the same time, a mobile mechanized column of the given ministry performs on the average for the country construction and installation work amounting to only 2 million rubles, while the average figure conceals many small-capacity mobile mechanized columns with a volume of work ranging to 1.1 million rubles per year. For this reason, V.D. Danilenko, the USSR minister of rural construction, is right in pointing out that "...mobile mechanized columns with no prospects of growth (to an optimal load) in the next 3-5 years, should be merged with other organizations or transformed into construction sectors; new organizations ought to be created only in exceptional cases."<sup>3</sup>

Consequently a step-by-step creation of integrated services and economic establishments would be useful in agricultural construction. This could be

done on the basis of the republic Latvkolkhozstroy Association, mobile mechanized units of the republic's Ministry of Construction, individual means of kolkhozes and state farms, Latvspetssel'montazh Trust of the organization of the State Committee for Selkhoztekhnika and other organizations. As can be seen from Table 1, plans of construction by individual means are fulfilled each year in the republic. They are not fulfilled by Latvkolkhozstroy and even less by the republic's Ministry of Construction. This to a certain degree shows that operation of construction at the farm level (construction with individual means is basically done at economically strong farms) is performed more effectively and efficiently than at the rayon and republic levels. For this reason it is very important to improve the organization and operation of construction in rural localities at the rayon and republic levels. It is also important to keep in mind here that a number of interkolkhoz construction organizations allocate a significant portion of their resources for the construction of nonagricultural facilities.

Taking into account accumulated experience, it would be useful at the first stage of construction in an integrated service to unite a minimal number of organizations involving a maximum volume of accomplished work. On the basis of the volume of work performed by these organizations, these could be the republic Latvkolkhozstroy Association, Latvspetssel'montazh Trust of the State Committee for Selkhoztekhnika and individual means of farms. The volume of these organizations includes approximately 70 percent of the work done in rural localities. Thus specifically Latvkolkhozstroy Association with its planning institute, Latspetssel'khozstroy Trust, the acquisitions and material-and-technical supply units of the State Committee for Selkhoztekhnika, the Main Administration of Capital Construction, Latgiprosel'stroy Institute and Agrokoks Interfarm Enterprise of the Latvian SSR Ministry of Agriculture could be united into a single republic establishment. This economic establishment within the framework of the organizations and units constituting it would solve questions of technical direction and planning and organization of production of construction elements of rural construction. In regard to questions that need to be solved at the intersectorial level, it would present individual proposals (requisitions, drafts of plans) to superior directive organs and departments.

At the same time, it would be possible to create a Glavsel'stroy Main Administration of Agricultural Construction within the organization of the Latvian Ministry of Construction at the location of Riga Regional General Construction Trust. Rural-construction mobile mechanized columns and the corresponding production base of rural trusts would be put under its jurisdiction. Subsequently, Glavsel'stroy, as an already formed rural construction unit, would be included in the Latvsel'stroy Production and Planning Association of Rural Construction, achieving thereby a still more integrated level in the republic's agricultural construction, which would definitively complete the concentration into an association of these planning, construction and installation organizations, industrial enterprises, supply and acquisitions units and service of the client engaged in rural planning and construction.

Directly subordinated to Latvsel'stroy remain plants and combines of republic and intererayon designation--Livany Experimental House-Construction Combine,

plants for reinforced-concrete structures (Sigulda, Kuldiga, Vetsumniyeki), Līvāny Production Combine for Construction Materials and Structures, the plant [\*\*] for production of keramzite in [\*] Nitsgaly and so forth. Similarly planning institutes, acquisitions units and the like are subordinated to the republic level.

In the solution of these questions, there should be taken into consideration the fact that in comparison with other republics, Latvian SSR and Estonian SSR do not have a Ministry of Rural Construction, with the existence of which the process of integration of different departments engaged in agricultural construction could be accelerated.

The fact that sometimes a different approach is used to different forms of organization of rural construction can be seen from the following example. Thus in 1973, the Ministry of Rural Construction was eliminated in Latvian SSR and its functions were turned over to the republic's Ministry of Construction. But the latter was actually deprived of a second source of financing and "loses" each year significant resources, which formerly were allocated by the union Ministry of Rural Construction for the development of rural construction. It would seem from the long-term point of view, that it would be more practicable to turn over these resources not to the republic Ministry of Construction but to the interkolkhoz construction organization for corresponding expansion of the material and technical base. It should be kept in mind that even at the present time the interkolkhoz construction organization is one of the basic contractors not only in regard to kolkhozes but also with respect to sovkhoses. A similar situation exists in Estonian SSR.

At the rayon level, it would be advisable to establish in the first stage a single plan of construction and installation work and capital repair for all organizations of the rayon agroindustrial complex, encompassing both facilities at agricultural enterprises and at agricultural-service organizations--the State Committee for Selkhoztekhnika, Sel'khozkhimiya, the interkolkhoz construction organization, the mobile mechanized column and the Construction Mechanization Administration of the Ministry of Land Reclamation and Water Resources (the work volume relating to land reclamation, irrigation and modernization of land-reclamation systems and cultural and technical measures is planned separately). This plan within the scope of the total limits reached by republic directive organs is developed on the basis of requisitions of individual RAPO members and is definitively determined by the RAPO Council. There subsequently may also be included in the single plan of construction and installation work facilities processing agricultural products which are directly subordinated to the RAPO Council.

The interkolkhoz construction organization should be determined by the rayon's head construction organization. In the agricultural enterprises of Latvian SSR in 1983 interkolkhoz construction organizations performed 39.4 percent, mobile mechanized columns of the Ministry of Construction--17.7 percent and kolkhozes and sovkhoses with their own means--40.3 percent of all the construction and installation work. It is assumed that this should also be done in the case where a republic has a Ministry of Rural Construction, of course and where a comprehensive material and technical base has been created

in the interfarm construction organization. But the basic reason for making the interkolkhoz construction organization into a general contractor of a rayon's agroindustrial complexes is that it was created on the basis of the initiative of agricultural enterprises, is most close to their interests, has a most elastic internal economic mechanism and can be directly subordinated to the RAPO Council.

The head organization sets up a single plan of construction with the aid of the rayon's agroindustrial complex and allots the necessary material resources. The head organization (the interkolkhoz construction organization in its turn determines the volume and kinds of work at individual facilities performed with their own resources, with the resources of the specialized mobile mechanized column of Latspetssel'montazh Trust and the resources of the farms.

Initially, such a procedure of organizing performance of work could be introduced in those rayons where the interkolkhoz construction organization has already become strong and accomplishes in a year not less than 4-6 million rubles' of construction and installation work and where the possibility has been proven of adopting other economic construction establishments. In the given variant, the head construction organization of the rayon would operate [\*\*] on the basis of the principle of [\*]"trust-area" ["trest-ploshchadka"] from the territory of the "area-administrative rayon" (see Figure).<sup>4</sup>

Such an integrated construction organization at the rayon level (for example, in the form of the Raysel'stroy Interfarm Construction Organization) should, depending on the specific conditions of one or another RAPO, manage with a varying degree of completeness capital construction and repair work of buildings and structures which are accomplished by individual means. Of course, as a model in which new construction should be combined with capital repair, it utilizes the experience of agricultural enterprises themselves where construction by individual means is developed. It would seem that assistance at the rayon and republic level should be restricted as a rule solely to the solution of questions of a methodological order and to functions of organization of material and technical supply, assistance in making up plans for capital repair, selection of technological solutions and complete allocation of construction materials and equipment by analogy with new construction. An important direction of development of Raysel'stroy could be participation in the performance of separate specialized operations (assembly of prefabricated structures of foundations, frameworks, walls, roofs and certaom other things) in conformity with requisitions of kolkhozes and sovkhozes and in modernization and reconstruction of buildings, renewal of equipment and improvement of technologies for the purpose of increasing the effectiveness of work performed by individual means. At Raysel'stroy auxiliary production bases, it would be possible to make a great deal (concrete solutions, complex mixtures of paints and the like) for individual-use needs.

Separately created interfarm enterprises of similar type should also be made part of a single construction establishment of RAPO. Attempts are being made of late to increase production of construction materials. At Bauskoye RAPO the Tseplis Interkolkhoz Enterprise was created for the production of construction materials; it produces brick and lime. In order to make better use of construction material that has been traditional in the countryside--

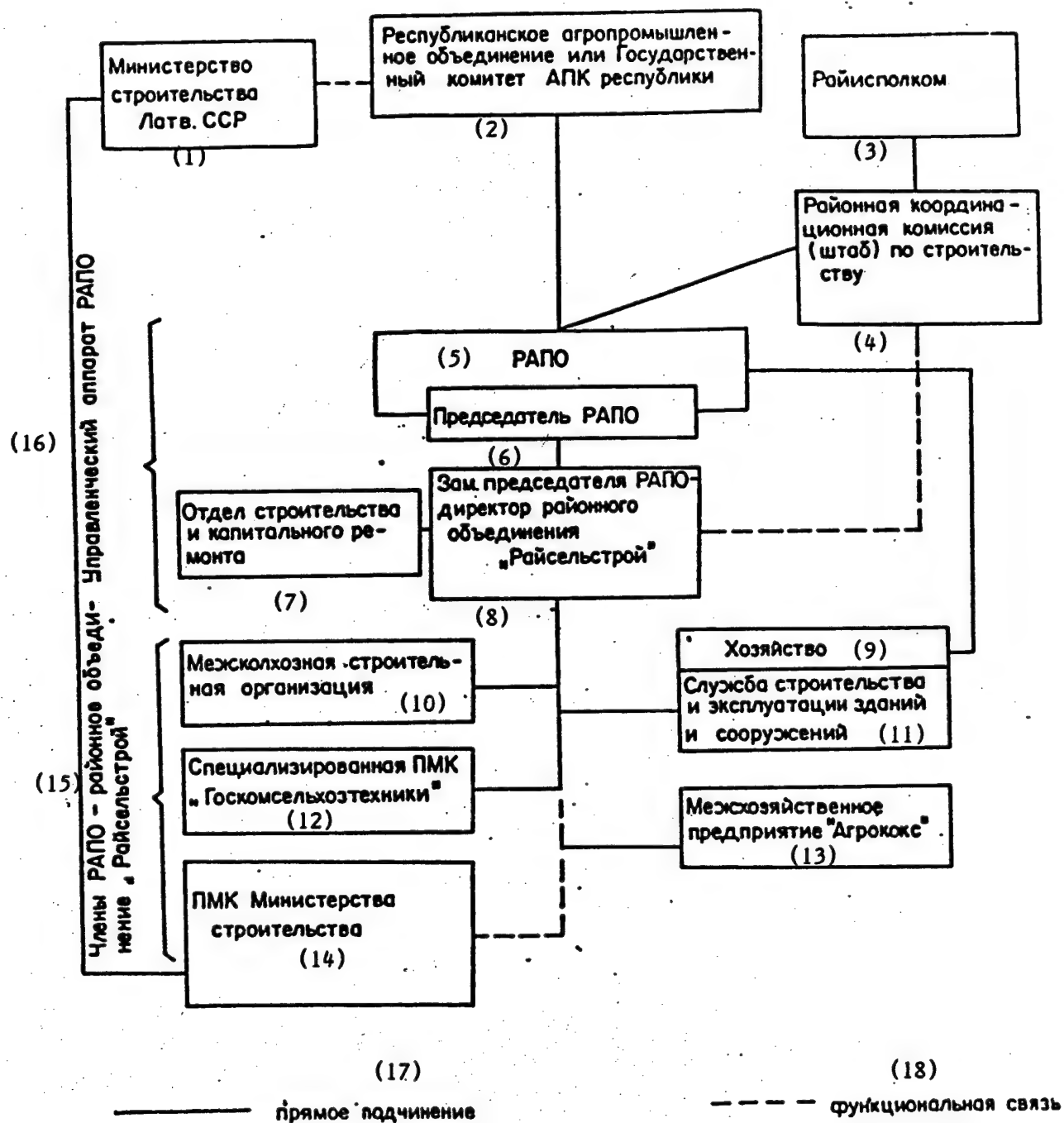


Figure. Organizational structure of construction services in RAPO.

[For key, see following page.]

Key to Figure:

1. Latvian SSR Ministry of Construction
2. Republic Agroindustrial Association or State Committee of Republic Agroindustrial Complex
3. Rayispolkom
4. Rayon coordinating commission (headquarters) for construction
5. RAPO
6. RAPO chairman
7. Department of Construction and Capital Repair
8. RAPO deputy chairman--director of Raysel'stroy Rayon Association
9. Farm
10. Interkolkhoz construction organization
11. Service for construction and operation of buildings and structures
12. Specialized mobile mechanized column of State Committee for Selkhoztekhnika
13. Agrokoks Interfarm Enterprise
14. Mobile mechanized column of Ministry of Construction
15. RAPO members--Raysel'stroy Rayon Association
16. RAPO administrative apparatus
17. Direct subordination
18. Functional relation

lumber--and to speed up the erection of single-domicile houses, Vidzeme Interfarm Enterprise was created at Valmiyera RAPO (with the participation of Valskoye, Limbazhskoye and Tsesisskoye RAPO) for the production of wooden houses of the prefabricated type with a capability of 20 houses per year.

Moreover, for the purpose of coordinating projected and plan decisions at the beginning of the investment cycle of construction projects, it would be advantageous to include in the RAPO integrated construction services a planning buro for the development of preplanning documentation, construction passports and also possible tying in of the most elementary model plans and development of documentation for reconstruction and repair. In this way, local (rayon) services of the republic's agriculture are ensured maximum independence in the operational solution of matters. At the same time, Raysel'stroy Association will guide construction units of kolkhozes, sovkhoses and other partners of a rayon's agroindustrial complex, providing them with required material and technical courses while cooperating in the use of manpower and construction equipment. At the present time, the production capacities of certain construction organizations are being insufficiently utilized and in others there is a shortage of them. For example, lines for processing timber in the system of the interfarm construction organization are used only 33 percent and areas for the fabrication of reinforced-concrete structures--72-82 percent. Capacities for metalworking are similarly employed.<sup>5</sup>

In the final analysis, all rayon-level construction units (shown in the figure) should become a single construction organization under the direct supervision of the RAPO Council, thereby eliminating the system of dual



subordination (to the republic specialized construction department and to the RAPO Council). This united Raysel'stroy Construction Organization of rayon designation in its production and financial activity can be guided by the statute on the interfarm enterprise (organization) in agriculture (established by Decree No 291 of the USSR Council of Ministers of 14 April 1977) while taking into account the operation of the Standard Statute on RAPO. The Council should at the same time perform the functions of the Raysel'stroy Council. Under these conditions, the client (kolkhoz, sovkhos) would only select a standard plan and indicate the place of the future construction site and then accept the finished facility, that is, transition was made to "firm" services and the client would be freed of burdensome concerns connected with construction. Initially, the Department of Capital Construction (OKS) of RAPO and subsequently the Department of Capital Construction, integrated with the construction organization in the person of the interfarm construction organization or Raysel'stroy, would have the legal right to act in the name of clients and work with planners and suppliers of equipment (review of plans, drawing up of documentation, placement of orders for equipment and also its receipt, installation and adjustment). In such a case, only a minimal number of engineer-builders would be left in the RAPO administrative apparatus (up to 5), who would be fulfilling the functions of distributing the bulk of construction and installation work among RAPO enterprises and technical surveillance over construction.

Other specialists are also reaching similar conclusions. Thus M. Vasilyev, the Secretary of Lvov Obkom of the Ukrainian SSR Communist Party, proposes to form within the oblast and rayons a single large agricultural production association that would include L'vovsel'stroy of the Ministry of Agriculture, Oblmezhkolkhozstroy, Oblmezhkolkhozdstroy and L'vovspetsssel'montazh. As a result of this there would be formed a single general contractor heading general construction and specialized services and units. Similar changes are proposed in planning.<sup>6</sup>

For 3 years, Pskovsel'khozstroy Combined Management for Rural Construction has been operating under the aegis of the oblast agricultural administration. It exercises the role of a sole initiator of rural new construction projects (general planning, assignment of limits, responsibility for technical policy at construction projects on 184 farms of the oblast). But experience has shown that the establishment of a single initiator is only half of the way to the goal. The system will be completely closed when a single executor appears at rural new construction projects who then would become the absolute master of all equipment, materials and construction personnel and would not divide the sites into his and others'. Similar proposals are also coming from other republics.

The USSR Ministry of Rural Construction, for the purpose of further improving construction organizations in rural areas turned over for examination by directive organs a proposal on combining all rural general construction and installation organizations into a single state cooperative system, including coordinating its structure with the structure of the agroindustrial complex according to the principle of management of the country's agriculture.<sup>8</sup> It is proposed to create a union-republic ministry of state cooperative construction, with general construction and installation organizations of

rural-construction ministries and interfarm organizations, scientific-research and planning institutes and so forth being turned over to it.

As has already been indicated, under the conditions of Latvian SSR, it would be useful to create such a development on the basis of interkolkhoz construction organizations since they are the main contractor for carrying out construction work in the countryside. The republic does not have a Ministry of Rural Construction. It should be added to this that the economic mechanism in interkolkhoz construction organizations is more elastic than in state mobile mechanized columns. Similarly, this question should apparently also be solved in a number of other republics where the interkolkhoz construction organization has become the basic contractor for doing this work in rural localities. Here one would like to emphasize the equivalence and comparability of development of both interkolkhoz construction organizations and state mobile mechanized columns. It would have been inappropriate to assert that only interkolkhoz construction organizations should draw closer to state construction mobile mechanized columns. Analysis shows that a significant improvement of the economic mechanism must also be implemented in state mobile mechanized columns.

The obstacle to the creation of integrated construction organizations is the existing arrangement of material and technical supply. At present every department tries to support its units of material and technical supply and is afraid to upset existing relations in material and technical supply, which can result in "unpleasantness" for a rayon or the republic. Of course, under conditions of wholesale trade in construction materials and equipment, the transition to integrated construction organizations would have been easier to resolve. For this reason it can be said that it would be simpler to begin with the top levels such a union of separate and disconnected monotypic agricultural service establishments.

Together with improving the development and organization of rural construction, it is necessary to devote more attention to rational utilization of forest resources. In terms of the character of the equipment used in felling trees and producing sawn timber and also in terms of development of its use, this sphere is most closely related to rural construction.

The basic user of felled timber obtained from forests of kolkhozes and sovkhoses is the sphere of capital construction and repair of buildings and structures. We know that on kolkhozes and sovkhoses many people and equipment are inefficiently employed and used in sawing timber and in producing carpentry products. In expanding the base of the interkolkhoz construction organization, there should be taken into account the requirements of kolkhozes and sovkhoses so that they could obtain sawn timber that they need in exchange for round timber. As part of auxiliary production of the interkolkhoz construction organization, it would be possible to create a lumber procurement sector and to turn over to it all of the rayon's felling-area resources for centralized procurement of the necessary quantity of timber for the interkolkhoz construction organizations and RAPO farms. This, of course, depends on the specific conditions of this or that rayon and first of all on the readiness of the interkolkhoz construction organization itself for carrying out these additional functions. Where such a solution is as yet

unfulfillable, it would be possible to create an interfarm enterprise (or combine, as was done in Kuldigskoye RAPO) for the utilization and reproduction of the forest resources of kolkhozes and sovkhoses (the Agrokoks Interfarm Enterprise) subordinated to the rayon agroindustrial association. Initially, the functions of the interfarm enterprise could be fulfilled by one or another agricultural enterprise with an already developed material and technical base for logging and production of sawn timber.

Some of the above-mentioned directions for improving rural construction under conditions of the agroindustrial complex could produce a definite economic effect expressed as follows:

--a better integrated, single construction material and technical base would be formed in RAPO. Certain duplicating elements of this base within the confines of the rayon would be eliminated. The possibility would appear of certain economy of capital investment through elimination of duplication;

--a closer cycle would be created for carrying out construction (preparation of documentation, securing of equipment, construction, installation of equipment and so on). The quality of construction would be improved and accelerated because of better balancing of separate parts in carrying out the whole cycle of work relating to construction and turning over of facilities for operation;

--the activities of the construction organization would be directly subordinated to the RAPO Council and to the interests of kolkhozes and sovkhoses. Efficiency of construction by individual means is being improved by enterprises and organizations coming under RAPO on the basis of close interoperation and cooperation with the rayon specialized construction organization in the performance of a number of operations. Better possibilities would be created for rational combination of new construction and reconstruction of existing buildings and determination of the priority of construction of facilities and the like;

--management of organization of construction would be brought closer to the actual process of construction. Certain functions relating to management of construction would be turned over from the republic to the rayon level, and the number of engineering and technical personnel for the operation of rural construction would be reduced.

#### FOOTNOTES

1. SOVETSKAYA LITVA, 3 Dec 1982.

2. Such fractionation is also to be found in the republic as a whole. According to data of the Latvian Scientific-Research Construction Institute of Gosstroy Latvian SSR, as of 1 January 1981, on the territory of Latvian SSR there were in operation 201 contracting construction and installation organizations and 87 repair and construction organizations belonging to 35 ministries and departments, that is, a total of 288. The volume of contracting work performed by these organizations in 1980

amounted to 717 million rubles (that is, an average of 2.5 million rubles per organization), including 472 million rubles for capital construction and 245 million rubles for capital repair and other contract work. These organizations employ 72,300 persons in construction and installation work and in subsidiary production operations, including 15,000 persons in repair and construction organizations.

3. Danilenko, V., "Rural Construction: Experience and Problems."--EKONOMIKA SEL'SKOGO KHOZYAYSTVA, No 3, 1984, P 59.
4. Pavitols, A.A., "Improvement of Management of Capital Construction in the Republic Agroindustrial Complex (based on materials of Latvian SSRE).--In the book: "Agrarno-promyshlennyy kompleks. Sovershenstvovaniye upravleniya" [The Agroindustrial Complex. Improvement of Management]. Riga, Zanatiye, 1981, pp 62-65.
5. Information bulletin of the Latvian SSR Ministry of Agriculture--PADOM'YU LATVIYAS LAUKSAYMNIYETSIBA, May 1982, p 61.
6. IZVESTIYA, 26 Jul 1980.
7. PRAVDA, 22 Jun 1982.
8. EKONOMIKA SEL'SKOGO KHOZYAYSTVA, No 3, 1984, p 60.

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## AGRICULTURAL CONSTRUCTION

### POOR QUALITY OF RURAL, AGRICULTURAL CONSTRUCTION BERATED

Moscow SEL'SKOYE STROITEL'STVO in Russian No 11, Nov 84 pp 20-21

[Article by M. Shulenin: "Bad Workmen: Trouble Signals"]

[Text] In meeting workers at the Moscow plant "S rp 1 Molot" comrade K. U. Chernenko came in contact with many vital problems and among them were the existing lack of direct contact with construction workers. He indicated the necessity of improving the quality of the products being manufactured: "It is time that we knew bad workmen by sight so that it is evident who is making poor-quality products. And we must make them strictly liable for their lack of responsibility."

Many collectives in rural contractor organizations are striving for the fruits of their labor to bring satisfaction. But workers who are permitting bad workmanship have still not been converted. There are quite a few of them in the Mari Kolkhoz Construction Association.

Much construction work is going on in the villages of the Mari Nechernozem. During the three years of the current five-year plan the "Markolkhozstroy" Association alone utilized 127 million rubles and put 1,325 projects into operation. During the current year they will do 50 million rubles worth of work and turn over 56,000 square meters of housing to the client here. All of this will promote the build-up of personnel at the kolkhozes [collective farms] and sovkhoses [state farms]. However, the slow rates of work are hindering the pace of construction. It is sufficient to say that the association permitted great delays in kolkhoz construction; after three years of the five-year plan 12,000 square meters of housing have not been turned over to the agroindustrial complex.

The poor quality of construction and installation work causes special concern. Complaints about bad workmanship and unfinished work at kolkoz projects are often received by the Ministry of Agriculture, the republic's state control agencies and even by the Mari Kolkhoz Construction Association itself.

Work on the construction projects being erected, for example, by the Yoshkar-Ola MPMK [PMK=mobile mechanized column] is not distinguished by its

high quality. In order to more fully understand the facts about the systematic bad workmanship let us go back two years.

The year is 1982. People's controllers often noticed violations of SNiP [Construction Standards and Specifications] at many construction projects. At the kindergarten that had been built the openings had been made so narrow when the bricks were laid that the window frames would not go in them. They used broken bricks when they laid the brick walls for the sleeping quarters at the "Sosnovyy bor" Dispensary. The vertical joints were not filled with mortar and, consequently, the load-bearing capacity of the walls was reduced. Brick partition walls were not reinforced here. They placed a rejected panel on the roof of the second story.

They say that you learn from your mistakes. This is true. But it is still not evident that the administrators and line personnel in the mechanized columns actively learned from the failures in their work. The scene is being repeated now. Much defective work was done on the garage for the "Sosnovyy bor" Dispensary and in the dormitory for 216 people. Gypsum board partitions were only partially fastened to the roof slabs. The wood floors were made from damp material.

The Yoshkar-Ola MPMK turned over a 60-apartment housing unit to the client in 1982 but the bad workmanship and unfinished work had still not been corrected this year.

Orshanka MPMK construction workers and specialists are not distinguished by the quality of their work. For example, they erected projects without preliminary geological surveys, without any local ties, and even without technical documentation. Not everyone dares to do such things yet the line workers at the MPMK do all of this without remorse. They built their own dormitory and a 27-apartment housing unit in the urban settlement of Orshanka in such a manner. The covered granary holding 3,000 tons at the kolkhoz imeni Michurin was assembled at north Velikopol'ye yet it was erected in a completely different location. They used substandard materials for the load-bearing components of the roof which will cave-in without any load. The modular foundation units extend only 30 cm into the ground instead of 210 to 220 cm.

And here are the most recent facts. The chimneys in the single-apartment housing unit at the same kolkhoz imeni Michurin were not completed according to the drawings through the fault of superintendent V. Pronin. Carpentry work was installed unevenly and the panels were painted without being primed. The heating system was not pressurized. The depth of the gravel subgrade under the floor does not correspond to the design. Due to an incomplete inspection by master A. Gordeyev waterproofing was not done and the foundation joints for the modular units were made of brick at the housing unit for the "Mayak" kolkhoz. The joints between the arbolite modular sections were not thoroughly caulked. Anti-corrosion protection was not put on the inserts that were laid for the silo trenches at this establishment.

Specialists in the construction laboratory at the Kilemarskiy MPMK fixed the defects and unfinished work at almost all of the projects that were checked.



The mortar is prepared "by eye" here and the master often does not know what grade it is or how much cement to put in the cement mixer for one batch. Control samples of the cement and mortar are not tested for their strength. Clay filler concrete partitions were to have been built according to the design for the construction of a 27-apartment housing unit yet they were built from silicate brick and without even any reinforcing or strengthening. The bond between the exterior and interior walls was not maintained.

Complaints are also made about the workers in the Morki region MPMK. For instance a cow barn at the kolkhoz imeni Marx and the KRS [not further identified] at the "Druzhba" kolkhoz were turned over for use several years ago yet it is still not possible to use them to full capacity. The fact of the matter is that they were put into use with defects and unfinished work. The ventilation works poorly, the mechanisms break down, and the floors were poorly made which quickly become useless

A similar scene can be observed at the KRS complex at the "Novyy put'" kolkhoz. The concrete is broken in the center portion of the four girders that were installed and the reinforcing is exposed. The modular units were not disinfected and the wooden beams of the lattice for the slate roof were not waterproofed in the places where they join the brick walls. Modular units were installed in several places in the calf pen of this complex having hairline cracks that extend the full height of the building. A roof slab with a crack in the load-bearing portion was also installed here.

Recently the chief of the Morki region OKC [Capital Construction Department], V. Yektuchinov, and his chief engineer, V. Mikhaylov, added new facts about bad workmanship during the construction of projects at kolkhozes to this sad list. Clubs at the kolkhozes imeni Lenin, "Rodina" and "Pobeda", 10 two-apartment housing units at the kolkhoz imeni K. Marx, the same number of housing units for one family each at the "Avangard" kolkhoz, and a boiler at the "Rodina" kolkhoz were turned over for use with serious defects and deviations from the design.

"Last year," complains I. Gur'yanov, chairman of the kolkhoz imeni Lenin in the Medvedevo region, "the local MPMK built us 10 housing units. But immediately after they became inhabited cracks appeared in the walls and the roof leaked. It is cold in the apartments and mold appeared in the basements.... As a result more than half of the inhabitants, and they are primarily specialists, left the new housing units which are now empty...."

He named more than 50 violations of the technical specifications and deviations from the design. But the strange thing about it is that the chairman of the Medvedevo MPMK, A. Mitsyuk, and the chief engineer of the mechanized column, V. Zhuravlev, took this calmly.

The chief engineer of the OKS in the Gornomariyskiy region, V. Berezin, says that the local MPMK erected 10 farm-type houses with defects and unfinished work at the kolkhoz imeni Mosolov as well as a kindergarten and incubator for ducks at other establishments. In the village of Mari-Turek stairway components fell down at a 27-apartment house that was being erected by the

local MPMK. Construction of housing units is prohibited by the Mari ASSR Gosstroy [State Committee for Construction].

All of this speaks of the unconscientious attitude of technical personnel to their responsibilities and the careless work of construction workers which can be explained by the lack of strict control and their lack of order. Indeed, generally accepted standards and regulations are not being followed by the subdivisions, the construction workers' indifference to the results of their personal labor and to its value and disregard for such concepts as a worker's conscience or honor is evident.

Obviously, bad workmanship at new rural construction projects does not go unnoticed--sooner or later it comes to light and is corrected. Yet all of this is associated with huge additional expenditures of labor, means and materials. Last year the quality service issued MPMK-14 directions for fixing defects. Based on a decision by the association's technical council the foundation of a 24-apartment housing unit was taken apart; losses amounted to several thousand rubles. A large sum was spent to redo work at the repair workshops of the "Svinoprom" Trust. To eliminate the defects at just 3 projects that were erected by the Novotor'yal'skiy MPMK 11,400 rubles were spent above the estimate.

Low quality is not just the fault and troubles of construction workers; a large portion of it must be attributed to industrial enterprises in associations. They have not only not developed their capacities and failed to meet the plan but quite often turn out and send products to construction sites which have large defects. The Kuyarskiy ZhBK [reinforced concrete components] Plant is most of all noted for this. This is what they say about it in the republic.

The chief engineer at the Mari Kolkhoz Construction Association, V. Tarkov--"the extremely low quality of the pieces and components from this enterprise frequently leads to accidents."

Chief of the Sovetskaya MPMK-2, N. Khatynskiy--"Kuyarskiy ZhBK Plant products arrive generally with defects and without any consideration of being fully equipped. This leads to components lying around without being used for months."

"Sovetskaya" asked that people's controllers be sent to a poultry plant that they were working on in order that they could become familiar with the defective products at the site. When they checked out the call it turned out that an assembled PSI-16-60 panel for poultry yard No. 3 was broken. The surface of it, as well as other panels, was more like a wash board. The exposed reinforcing mesh protruded from the inside. The breakage occurred due to the fact that poorly welded-on inserts had been ripped out of the concrete.

When they began to level the poorly assembled SKT-3-42 columns at poultry yard No. 4 one of them broke. It turned out that there was no reinforcing for a length of 20 cm in the end of one of the columns. The reinforcing and also reinforcing mesh in other components was exposed. Inserts were installed at

varying distances from the end: instead of the specified 10 cm they were set off here 3 cm and there 35 cm. It was sufficient to hit them once before the inserts readily broke off the panel.

The specialists noted many other instances where reinforced concrete pieces were turned out without reinforcing. The stair landing for a 36-apartment housing unit that was under construction broke into several pieces due to the fact that there was no K-30-3 component in it. In the words of the senior engineer at the association, G. Svetovidov, they simply forgot to put in the reinforcing. He also noted that the Kuyarskiy ZhBK plant constantly turned out defective products last year up to 100 and more cubic meters per shift.

At a meeting of the Mari Kolkhoz Construction Association management in May of last year administrators of the enterprise announced that "defective components are no longer being shipped to construction sites." But their assertion remains just an excuse.

In February and March of this year 133 pieces were shipped to the silage trenches and potato storehouses that were being built by the Mari-Turek MPMK and all of them had significant defects--mixed inserts, rounded ends, cracks. They shipped four beams that were unsuitable for use to the club building under construction at the "Avangard" kolkhoz, one of which was broken.

They delivered two roof slabs to the local MPMK for the hospital under construction in the village of Medvedevo and both broke into pieces when being unloaded. The reason was the extremely poor quality of the concrete. Twenty four stair treads also proved to be defective.

The deputy chief engineer of the association, V. Gorin, said that on 5 May of this year the commission inspected the flights of stairs--Kuyarskiy Plant products--that were delivered to one of the projects and 5 of 7 were defective. Inserts were missing in the flights of stairs, the components had load-bearing ribs that were curved and there was an excess of concrete.

Almost all of the piles that were shipped to the Zvenigovo MPMK-138 for the foundation of the club, store and dormitory proved to be unusable due to their extremely low load-bearing capacity--twice as low as GOST [state standards]. The Kuyarskiy ZZhBK Plant delivered 39 PKZh [reinforced concrete roof slabs] for KRS trusses to this same mechanized column of which 37 did not match the working drawings in dimensions and several components proved to be totally defective. Mixed inserts were discovered in 48 semi-frames that had been assembled beforehand here while 4 had inadmissible cracks.

The Kuyarskiy Plant is really creating accident situations at construction sites with such quality in the construction products it turns out.

And how can this not happen when an enterprise is cluttered, the passages are jammed, water is on the floor and operational control is non-existent. Overheating of the steel is permitted when preparing the reinforcing framework and mesh. The forms for the pieces are in a run-down condition, they are

warped and there are gaps in the hinges of the latches. Practically no one keeps an eye on the condition of the equipment.

The question arises--where are the workers in the OTK [technical control section] looking and for what are they receiving their pay?

Much criticism arrives at the address of the Soviet SSK [rural construction combine]. It had just recently been predicted to gain fame as the main base for the republic's rural construction industry and instead the enterprise is turning out incomplete products. There are many defects here especially in parts for housing units, and the components that are turned out have a low factory finished level. Road slabs and footings do not have smooth faces and there are many fins in them. There is no anti-corrosion protection on the inserts. The finish work on the facade panels is of poor quality--the surface layer is not uniform and the hue varies.

An especially large number of defective components is delivered to the Sovetskaya MPMK-2. A roof panel that was delivered here for a housing unit had a crack that was more than 5 cm long and when it was being taken apart it broke. Then they sent still two other broken PK-32-12-K slabs that soon broke apart (the bottom mesh proved to be missing) even though there was a Soviet SSK OTK-2 stamp on the pieces.

But the administrators and specialists in the brick plant at this combine broke all "records" for bad workmanship. A brick must be sound and, as they say, "not dissolve in water nor burn up in fire." And what do you get at the Soviet SSK?

At the beginning of the year workers in the construction laboratory tested several sets of bricks that had been packed to be shipped and discovered more than 30 percent were defective in each one of them. In May and June only 61 percent of the bricks proved to be usable. The brick does not correspond to GOST in its geometrical dimensions, especially in thickness, and there are intolerable cracks and curves. Up to 30 percent are underfired.

Here is what the consumers themselves say about the bricks. Foreman of the Paran'ga MPMK N. Samigullin--"Just upon seeing a truck loaded with red brick from the Soviet SSK the masters and foremen groan and the construction workers curse through their teeth. And there is a reason for this--when they deliver the brick without pallets it cannot be unloaded but is simply swept out with a broom. It is a continuous battle."

The chief of the OKS in the Novotor'yalskiy region, V. Ivanov, wrote to the republic Ministry of Agriculture that instead of brick they ship rubble from the Soviet SSK and they take defective brick which is twice as expensive as the price list.

It is no accident that rural construction workers often refuse such products. But the director of the SSK, A. Kobayakov, and the chief engineer, A. Tikhonov, are not dejected--if the consumers do not take them there are buyers elsewhere. Their products will be consumed just the same.

...Much criticism continues to come into the Mari Kolkhoz Construction Association, the Mari ASSR Ministry of Agriculture, the republic gosstroy, and people's control agencies about the poor quality of construction in the village and the shipment of defective products to rural construction sites. Commissions are sent to the sites, acts are written, some sort of conclusions are drawn. But the bad workmanship is corrected at one project and at the same time the bad workers are not sleeping at others. Evidently you cannot get at them with acts. But if the cost of each defect and each broken component were taken out of the pay of the guilty party then it would be another story.

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## HOUSING CONSTRUCTION

### LATVIAN COOPERATIVE HOUSING CONSTRUCTION GOAL NOT MET

Riga SOVETSKAYA LATVIYA in Russian 21 Nov 84 p 1

[Article: "Cooperative Housing Construction"]

[Text] In recent years significant development in our republic, as well as throughout the entire country, has been attained by cooperative housing construction, being carried out by means of state credit and by drawing upon the funds of the population. During the present five-year plan alone the total living space of cooperative houses built in Latvia has amounted to roughly 400,000 square meters. Housewarmings have been celebrated in them by tens of thousands of persons. Before the end of this five-year plan it is intended to put yet another 120,000 square meters of housing into operation. The state has allocated about 100 million rubles for this purpose during the five-year plan. The volume of capital investments in cooperative housing construction is increasing from year to year.

However, the pace of cooperative housing construction is still not rapid enough. At times the contracting construction organizations do not pay the necessary attention to this. As a result, during the first three years of the 11th Five-Year Plan the assigned task with regard to introducing cooperative housing was fulfilled by only 90 percent. Nor were the plan tasks with regard to assimilating the allocated funds fulfilled. Judging by all the indicators, the plan for putting cooperative housing into operation will not be completely fulfilled this year either.

Cooperative construction is lagging behind in Riga, Ventspils, Rezekne, and Yelgava. The situation with regard to assimilating capital investments allocated for cooperative housing construction is somewhat better in Daugavpils and Lielvaya. A particular slow pace is being followed in cooperative housing construction in the rural areas, construction being carried out by contracting organizations under this republic's Ministry of Rural Construction.

Such a situation leads to a regular violation of construction deadlines. It is often the case that houses take twice or even three times as long to build than the time provided for by the norms. This causes justifiable complaints from the shareholders of the housing-construction cooperatives.

Still during the current year the Tsis General Construction Trust was supposed to start building a 44-unit apartment house for the Gauja Housing



Cooperative. Up to now, however, it has simply not begun construction on it. And when the members of the ZhSK [Housing Construction Cooperative] began complaining about the failure to meet the established deadlines, the builders referred to the fact that they could not proceed to begin operations since it was necessary to divide up the utility lines running through the construction site. But was it really impossible to resolve this problem ahead of time?

Construction deadlines have been extended and delayed in the matter of allocating land sites for cooperative houses, provided with sources of energy supply and engineering networks. There are quite frequent cases where, because of a lack of a heat supply or gas supply, the deadlines for putting into operation already-built cooperative houses have to be extended for a long period of time.

Such a situation is to be explained, to a considerable extent, by the fact that the capital construction boards and divisions of a number of ispolkoms of local Soviets of People's Deputies are not yet exercising sufficient quality controls over the planning and execution of construction operations or the observance of normative construction deadlines for the houses of housing construction cooperatives.

Likewise being too slowly eliminated are the flaws in workmanship, revealed at the time when the cooperative houses are turned over for use. This is testified to by the complaints from apartment-owners which arrive at our editorial offices. Thus, during the first few months after the housewarming defects began to appear which had been permitted by the builders during the construction of House No. 50, belonging to the Ziyemel'blazma Housing Cooperative, and located in Vetsmilgravis, along the first line. This is the fourth year in which the Furmanov family has been trying to eliminate the penetration of moisture into their apartment. And to this day the Riga Home-Building Combine, which built this house, has been unable to accomplish this.

There are still quite a few unsolved problems pertaining to the technical operation and repair of the cooperative housing stocks. Houses built during the last 15--20 years have been outfitted with all sorts of communal conveniences, and their current and major repairs require a great many building materials, sanitary engineering equipment, devices, etc. Also necessary are skilled specialists to carry out the repair work.

A situation exists whereby the housing-operation organizations of the ispolkoms of the local Soviets of People's Deputies could assume the duties of servicing the cooperative houses. Some of the housing cooperatives concluded the appropriate agreements with the housing-operational organizations. But certain cooperatives for various reasons have refused to conclude them and are independently servicing their own houses, without having a technical base for this purpose. As a rule, the service personnel here are "moonlighters," who perform their duties in the cooperatives whenever they have a mind to and whenever they have some free time. The houses are being worn out because the cooperatives have not been allocated the materials necessary for technical operation and repairs.

Obviously, it is high time that more attention be paid to the problems of operations and the status of the cooperative housing stocks. At the present time

the problems of cooperation in housing construction are handled by divisions of the ispolkoms of the local Soviets. However, their functions most often boil down to merely organizing the cooperatives, while the main problem--how cooperative housing is being used and what condition it is in--remains, as a rule, outside their field of vision. And the cooperatives need to be given aid in this matter; there must be periodical, technical inspections of the houses of the housing-construction cooperatives, as well as monitoring controls on their activities.

As a person in the eyes of the law, a cooperative is obliged by the normative statute to draw up established balance sheets by means of which the cooperative's members and the appropriate organs can, at any time, see the financial status of the cooperative. Here too, however, the necessary procedure has not gone into effect everywhere.

The number of cooperative houses is constantly increasing. Therefore, the managers of the communal-housing and construction-repair organizations, as well as the local Soviets of People's Deputies, must accord more attention to the complex of problems pertaining to the service and repair of houses belonging to cooperatives. The republic's planning and supply organs must make provision in the drafts of the state plans for economic and social development for the allocation of material resources to conduct current and major repairs on houses of housing-construction cooperatives, as provided for by the decree of the USSR Council of Ministers dated 19 August 1982 and entitled "On Housing Construction Cooperation." This is a matter of conserving general state property. And this must be approached in a manner worthy of the state.

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## HOUSING CONSTRUCTION

### SOLUTIONS TO PROBLEM OF LOW QUALITY HOUSING PROPOSED

Tashkent PRAVDA VOSTOKA in Russian 25 Dec 84 p 1

[Article by V. Skrebnev, Chairman of the Uzbek SSR Gosstroy [State Committee for Construction Affairs]: "How Can We Feel at Home? How the Resolutions of the 16th Plenum of the Uzbekistan Communist Party Central Committee are Being Met"]

[Text] Uzbekistan occupies one of the leading positions in the country in volume of capital investments and the rates of their growth. Based on all sources of financing more than 6 billion rubles of capital investments are put to use and housing units having a gross area greater than 6 million square meters; many schools, kindergartens, polyclinics, etc. are being put into operation every year in the republic. The projected capacity of the housing construction combines in operation now amounts to 3,385,000 square meters and the degree of prefabrication in housing construction has approached 70 percent.

The successes are obvious. Yet quite a few problems have built up. The 16th Plenum of the Uzbekistan Communist Party Central Committee noted them with no uncertainty, having required that a model system be in place in housing construction. Special concern must be shown toward improving the quality of housing units being erected and improving their longevity.

"As workers the foremen of the housing construction combines--the authors of the letter addressed to all construction workers in the country--acted according to their conscience," noted comrade K. U. Chernenko at a meeting of the CPSU Central Committee. "As everyone well remembers, they made an appeal to decisively improve the quality of the housing that is being put into use. It was no accident that this letter received such a broad response and that the CPSU Central Committee approved a special decree in support of it."

In many instances new housing developments are clouded by finish work, and plumbing and mechanical work that is done in a careless manner and that has a large quantity of unfinished work or incomplete amenities for the apartments.

The numerous complaints by the workers in our republic to party and soviet agencies and to the Uzbek SSR Gosstroy testify to this. There are especially many complaints about the quality of the finish work: laying the floors, the facing, the installation of millwork, the preparation of the joints,

amenities, etc. It cannot be said that extreme measures are not being taken against bad workmen. During the current year alone the State Construction Inspection Department in the republic's Gosstroy has issued citations against 71 projects; work was suspended at 29 construction sites and more than 7 million rubles were withdrawn from contractor organizations due to poor quality workmanship.

Similar measures are being taken by local state architectural and structural control agencies as well. But even these extreme measures will hardly produce the desired effect if we are not concerned with solving the entire complex of problems associated with improving the quality of construction.

The first obligatory condition is to further improve the industrialization of construction and the degree to which products are prepared at the factory. However, matters are moving slowly. It is planned that only 74 percent of the average annual capacity of housing construction enterprises will be used in 1984 at the same time that USSR Gosstroy was given a goal of increasing this indicator to 85 to 90 percent.

The capacities of housing construction combines in the Uzbek SSR Ministry of Construction at Dzhizak, Almalyk, Gulistan, Samarkand, Nukus and Karshi have an extremely low level of use.

In recent years more than 30,000 square meters of housing components were shipped from Tashkent alone to Dzhizak Oblast. What the cost of the construction of these housing units came to can be calculated as well as how this reflected on the quality of the components and pieces.

Affairs could not be better in the republic's Ministry of Rural Construction where 76 percent of the capacities of DSKs [Housing Construction Combines] are planned to be used. At the same time the volume of construction for housing units made from brick and other materials having small pieces exceeds 70 percent in the ministry's system.

Calculations show that by bringing the projected capacities of operating DSKs up to standard without any additional expenditures it will be possible to improve labor productivity by 1.5 to 2 percent for the republic as a whole.

At the same time an improvement in the quality of linoleum, brick, glazed tiles, etc. supplied by enterprises in the Uzbek SSR Ministry of Construction Materials must be achieved.

Another important goal is to reduce the proportion of manual labor which exceeds 60 percent of the total consumption of labor in construction today.

For example, it took 3,100 people just to build partitions from small pieces. If this contingent were switched to large-size partitions that are completely factory finished, then an additional 28 million rubles of capital investments could be put into use each year. However, capacities for turning out such types of partitions remain insignificant while the level of their factory

An aspect such as the fact that the construction of microrayons is not being done in a complete manner in many cities in the republic has to be disturbing. Often construction of commercial and service projects lags extremely far behind the construction of housing. Thus, the dissatisfaction and complaints of the residents in these microrayons is completely understandable.

The main reason is the unsatisfactory work of contractor construction organizations in the Uzbek SSR Ministry of Construction, Glavtashkentstroy and others that systematically do not meet the established plans for the construction of the above projects due to deductions from the funds allocated for housing construction.

For example, more than 20 million rubles were not utilized for this type of work during the 10th Five-Year Plan while the amount not utilized is reaching 2.5 million rubles annually during the current one. And this is despite the existing statute that states that accepting housing units for use in new microrayons must be done in the form of complete urban development complexes. The statute regarding the urban development complex which was drawn up and approved was distributed to all ispolkoms to be implemented but work has not improved in this area.

It is time to stop such a practice. The client and contractor should bear the same responsibility for putting commercial and service projects into operation on time as well as for completing improvements such as small architectural forms, landscaping, etc. as they do for putting housing and schools into operation.

It is necessary to achieve a steady rate of turning over housing units for use and not permit what usually happens--40 percent of the housing is put into use during the fourth quarter. This, by the way, is one of the potentials for putting an end to crash work which gives rise to a numerous amount of work that must be redone, defective work, and to the non-productive consumption of state funds.

The republic's Gosstroy, oblast and municipal departments for construction affairs, and architects and design organizations, having drawn appropriate conclusions from the requirements of the CPSU Central Committee and 16th Plenum of the Uzbekistan Communist Party Central Committee, are making every effort so that instances of accepting projects for use with defects are eliminated and so that they will aid in ensuring that the buildings and structures which are erected are of high quality.

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## CONSTRUCTION METHODS AND MATERIALS

### PREFABRICATED, QUAKE-RESISTANT HOMES DEVELOPED

Moscow ZHILISHCHNYE STROITEL'STVO in Russian No 10, Oct 84 p 20-21

[Article by I. F. Tsipenyuk, candidate of technical sciences and L. A. Mukhamedshin and V. M. Gorbenko, engineers (TashZNIIEP) [Tashkent Plant Scientific Research Institute for Experimental Design]: "On the Development of New Series of Earthquake Resistant Housing Units"]

[Text] The production of nine-story large panel housing units based on third generation typical designs that were worked out by TashZNIIEP as a part of series 148 is being developed for climate region IV. Improved architectural planning and technical indicators are in the new series. The components for the members and the butt connections in the typical designs were used based on the "All-Union Catalog of Industrial Reinforced Concrete and Concrete Products that are Required to be Used in large panel housing units and public buildings."

Developing the products mix at the new KPD-4 [plant for large panel housing construction] plant in Tashkent and the KPD-2 plant in Samarkand revealed a number of defects that did not make it possible to achieve the estimated parameters that were specified by the technological design. In association with this an analysis was conducted of all plant deviations. For example, the length of time to manufacture products from lightweight concrete was established as 30 minutes and 18 to 22 minutes for products made from heavy concrete. However, the actual duration substantially exceeded the estimate at certain stations.

When placing the reinforcing in the form a portion of the members in the three-dimensional framework is fastened with the aid of perimeter equipment and therefore their installation occurs after the framework is placed in the form. The actual installation time proved to exceed that which was projected by a factor of 1.5 to 2. On the basis of a structural and technological evaluation of the reinforcing pattern for the panels it was suggested that prefabrication of the three-dimensional framework be increased by means of partially changing the make-up of the individual members and also by simplifying the method of fastening them.

About five years passed from the time that series 148 was worked out to the time that it was developed for use and during that period the standards for designing large panel buildings changed. As has already been noted vertical and horizontal butt connections were used in series 148 based on the All-Union Catalog. At the same time there was no methodology in SN 328-65, which was in



effect during the time that the series was being designed, to determine the resistance to the movement of the butt connections nor sound recommendations for the structural reinforcing of the members. All of this led to the fact that several structural members have an excessive load-bearing capacity.

Research was conducted by TashZNIIEP on the action of butt connections which showed that the installation of rigid connections was not required in modular sections that were designed to have 7 to 8 points in 80 percent of the membrane, i.e. resistance to movement along the upper portion of the wall panels is ensured by friction forces. Therefore, an approach was used (when it is not required based on calculations) of installing rigid connections only in those members where it is necessary due to structural considerations for providing connections between wall panels and slabs; for example, in stairwell walls and also in the butt end of walls. This made it possible to reduce metal consumption in wall panels, in particular in VS4 type panels (Diagram 1) along with improving manufacturing technology.

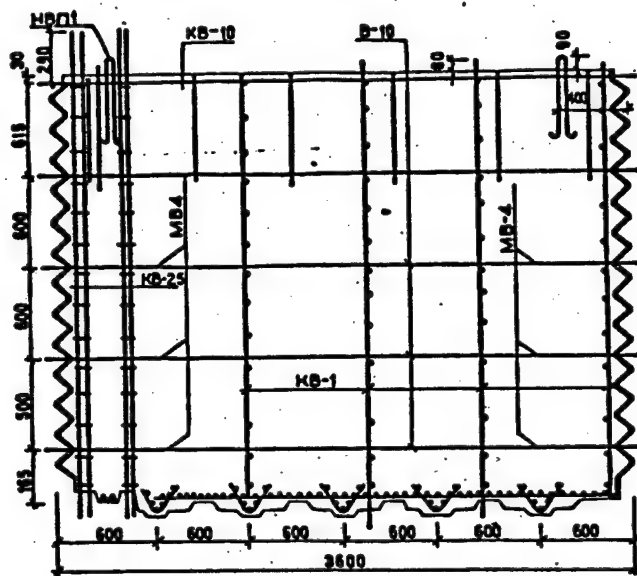
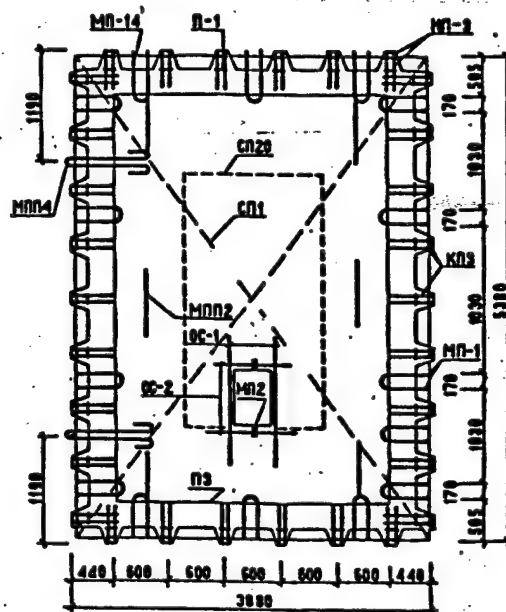


Diagram 1. Revised pattern for reinforcing a VS4 wall panel.

Reinforcing production appeared to be the weak link in the overall technological flow of manufacturing the products. The actual productivity of fabricating the framework for wall panels on an SMZh-286 vertical welding device amounted to 8 to 10 units instead of 24 units per shift. The productivity of the welding devices depends on the number of welded points which is determined by the spacing of the horizontal and vertical reinforcing along the floor of the panel. A typical design was specified with a spacing of the reinforcing at 300 and 600 mm horizontally and 600 mm vertically.

In order to reduce the number of welding points during fabrication it was suggested that the vertical and horizontal reinforcing along the floor of the

Standardizing reinforcing components has significant potential for improving the technology of reinforcing work by which complete installation is simplified and storage space is saved. Standardization of the mesh that is used is especially needed since the total capacity of multi-point welding machines at KPD plants is low. Mesh with 12 different grid sizes were specified in the products list not counting mesh manufactured by single-point welding machines. Such diversity in mesh leads to partial idle time for multi-point welding machines due to the necessity of readjusting them and lowers their shift productivity. Mesh with grid sizes of 150 x 150 mm or 100 x 150 mm are made from 6ASh rods parallel to the short side and BVr1 bars parallel to the long side in the typical design for reinforcing slabs. Based on a computational analysis it was recommended that slabs be reinforced with mesh having a 150 x 250 mm grid from BVr1 bars. When the load-bearing capacity in the center portion of a slab with an ordinary mesh is not specified then a second row of the same mesh is installed, the size of which is determined by a diagram of the bending moments. The given reinforcing pattern is in complete conformity with the requirements of SNiP [State Standards and Specifications] 11-21-75. Tests that were conducted with the most unfavorable loading pattern have shown that the load-bearing capacity and rigidity of the slab is ensured (Diagram 2)



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Based on an analysis of the reinforcing in other members of series 148 manufactured by plants the possibility was discovered of using mesh with a standard grid size in them by changing the diameter of the reinforcing where required. When laying out the mesh the fact should be kept in mind that the bars in mesh with a spacing of 150 mm must be arranged vertically in exterior and partition wall panels and parallel to the short side in slabs, bathroom sections, and stairwells. The use of reinforcing mesh with a uniform grid size eliminates idle time for multi-point welding machines and makes it possible to reduce the length of time for manufacturing mesh.

A substantial portion of the metal in panels for earthquake-resistant large-panel buildings is consumed for connections that ensure a bond and the joint working of the prefabricated elements. The stress conditions for such connections are different than the conditions for the rods which are under the influence of a pull-out force toward which the standard requirements of SNiP 11-21-75 for anchor fastening reinforcing are oriented.

The tests that were conducted on the movement of butt connections with anchors made it possible to determine the required depth of embedment by taking into consideration the actual conditions for use. The depth of embedment that would produce a break in the rods when movement occurs without the anchor pulling out is not to exceed 15 diameters of the rod for anchor connections. Reducing the design depth of the embedment of the connections in the slab made it possible to additionally reduce the consumption of metal.

During the course of developing the series measures were implemented that were intended to reduce labor consumption for installation work. For example, in order to improve safety during installation the sequence of fabrication for the members used in open facilities was changed, the components in the joints of basement panels for monolithic foundations were reworked and cross reinforcing of the horizontal joints was eliminated. Based on the results of building the first representative housing units in series 148 revisions were made in the working drawings. This made it possible to improve the technical and economic indicators of the designs. The consumption of steel was reduced by 11 to 12 percent and the total labor expenditures to manufacture and install the products were reduced by 4 percent in the designs for housing units assumed to have 9 points. The annual economic savings amounted to 470,000 rubles for the Tashkent DSK-4 and 320,000 rubles for the Samarkand DSK.

As experience has shown a large portion of the measures reviewed above can be instituted at many DSKs that turn out earthquake-resistant housing units with a minimum amount of expenditures.

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CONSTRUCTION METHODS AND MATERIALS

ADVANCES IN PERLITE PRODUCTION TECHNOLOGY VIEWED

Moscow STROITEL'NYE MATERIALY in Russian No 10, Oct 84 p 28

[Article by I. L. Mayzel', candidate of technical sciences (VNIPI [All Union Scientific Research and Design Institute]) for Thermal Design Work: "Improving Expanded Perlite Technology and Products Made From It"]

[Text] A seminar in Kiev organized by the State Scientific Research Institute for Construction Materials and Products (NIISMI) in the UkSSR Ministry of Construction Materials and the republic House of Economic, Scientific and Technical Propaganda in the UkSSR "Knowledge" Society was devoted to problems of improving production efficiency for expanded perlite and products made from it. One hundred and fifteen people from 6 republics (34 cities) took part in the seminar--representatives of ministries and departments, scientific research and design institutes, and enterprises that produce expanded perlite and products made from it.

Approximately 2.5 million cubic meters of expanded perlite and more than 600,000 cubic meters of products made from it are being turned out by 65 enterprises. However, production capacities are not being fully utilized. The largest enterprise is the Mytishchi "Stroyperlite" Combine which produces more than 500,000 cubic meters of expanded perlite per year. The problems associated with exploring for and extracting the perlite raw material, improving the technology for expanded perlite, building mechanized highly productive lines to manufacture effective heat insulation materials, products and components, working out new technology with low energy consumption, using expanded perlite for obtaining lightweight concrete for enclosure components, dry plaster mixtures and other products were highlighted in the lectures given at the seminar.

The lectures devoted to developing the raw materials base for perlite enterprises indicated a need to completely study and treat perlite rock deposits and posed questions related to expanding work to explore and pre-explore perlite deposits first of all in the regions of Siberia and the Far East, as well as questions related to speeding up the development of designs and the construction of technological lines to produce narrow fractionated perlite raw materials in accordance with GOST [state standards] 25226-82 at the Agara, Beregovoy, and Mukhor-Talin open pits.

In order to improve the quality of expanded perlite sand the VNIPI for Thermal Design Work, NIISMI, and VNII [All Union Scientific Research] for Stomatology Institutes have worked out new components for a sand that makes it possible to obtain a product that has a higher degree of strength and lower moisture retention with a minimum content of pulverized fractions. Lectures (by MIKhm [Moscow Chemical Machine Building Institute] and VNIPI for Thermal Design Work) were devoted to problems associated with reducing pulverization, improving the degree of sedimentation of expanded perlite sand, and preserving the environment which proposed new highly effective dust collectors and precipitators for the finished product. Dust collectors that have twisted counter currents make it possible to obtain a degree of cleanliness up to 99 percent.

In the field of research on the expansion processes it was reported that new laboratory equipment has been built that makes it possible to simulate the processes taking place in industrial sand with a high degree of accuracy which substantially simplifies the selection of the technological methods of roasting perlite.

Original equipment for researching the process of expanding perlite by the barothermal method was also proposed which will make it possible to work out new thermal units for expanding purposes.

A number of lectures were devoted to the science of producing heat insulation products and components at the Mytishchi "Stroyperlite" Combine (perlitephosphohelium slabs, perlite plastic concrete), the Dimitrov Plant for Heat Insulation Materials (perlite cement products, dry asbestos and perlite mixtures), and the Ramenskoye Experimental Plant for Bituminous Perlite Pipe Insulation. The lectures also spoke of new developments that are being proposed for adoption. These are new thermal technology for producing perlitephosphohelium slabs having greater strength and perlite plastic concrete (plastiprene) having a lower resin content at the Mytishchi "Stroyperlite" Combine; improving the technology for producing bituminous polyethylene insulation for pipes by using bitumen without sulphur and foam polyethylene wraps (the Ramenskoye Experimental Plant for Bituminous Perlite Pipe Insulation); obtaining higher quality bituminous perlite through the forced heating of bitumen in devices with pulsating combustion (the Brest Reinforced Concrete Components Plant); and technology for cold bituminous mastics for insulating roofs (Gomel'stroy).

New highly effective heat insulation materials and products have been developed in a number of scientific research institutes which have been tested in experimental industries under industrial conditions. VNIPI for Thermal Design Work has developed the technology for lignoperlite slabs intended for insulating roofs and for manufacturing three-layer enclosure panels. The technology consumes little energy and uses waste products from the pulp and paper industry. Experimental industrial production has been set up at the Khot'kovo Heat Insulation and Finish Materials Plant. The technology for an insulation and acoustical material, "Armiks-3", has been developed at NIIS [possibly Novocherkassk Engineering Institute of Municipal Construction] (Yerevan), which uses waste paper. It has been proposed that the production of "Armiks-3" tiles be introduced at a number of plants.

The technology for an alkali-containing material--thermal perlite intended for use under temperatures of up to 600 degrees Celsius--has been developed at MISI [Moscow Civil Engineering Institute] imeni V. V. Kuybyshev. An experimental industrial line is being installed at the Dmitrov Heat Insulation Products Plant. The technology for granulated perlite fillers having a density of up to 300 kg per cubic meters has been developed at NIISMI and is being adopted on an experimental basis at the institute.

In association with the necessity of saving fuel and energy resources the demand for thermal resistance in enclosure components for buildings has substantially increased. Therefore reducing the density of lightweight concrete is taking on great significance. This is achieved by introducing expanded perlite sand and products made from it into porous clay filler concrete. A number of lectures reported on economic enclosure components manufactured by using expanded perlite sand and products made from it for housing and public buildings and on the experiences of producing porous clay filler perlite concrete. Attention was focused on the need for obtaining durable expanded perlite raw materials.

Much of the information dealt with the production of filter powder--filter perlite for enterprises in the food industry and perlite and graphite mixtures for metallurgical enterprises.

In conclusion, the participants in the seminar accepted recommendations directed toward further developing the production of expanded perlite and products made from it and also toward improving the coordination of work in the field of research and the introduction of materials made from it.

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## CONSTRUCTION METHODS AND MATERIALS

### ACCESS ROAD TO KOTLIN ISLAND NEAR COMPLETION

Moscow KRSNAYA ZVEZDA in Russian 30 Dec 84 p 1

[Article by A. Zlydnev, captain 1st rank: "Operation 'Barrier'"]

[Text] An important event happened yesterday related to the construction work on the "sea shield" for Leningrad: construction of an operating highway between Gorskaya Station and Kotlin Island was completed.

We have waited for this day and prepared for it. The collective of many thousands of construction workers that is erecting a unique complex of structures to protect Leningrad from floods brought the day closer by their feverish work. An important stage in construction was completed--pouring the 25-kilometer dam that joins Kronshtadt with the mainland.

The last few weeks were especially tense. Work stopped neither day nor night. Completely mechanized crews led by A. Molodkin, V. Buyanov, V. Zheludev, and V. Pankov approached each other from Kotlin Island and Gorskaya Station.

Socialist competition has spread extensively in the labor collectives for the right to pour the so-called "golden cubic meter." Having assumed as their labor duty this memorial dedicated to the 40th Anniversary of the Great Victory, the construction workers substantially exceeded their shift goals. An operating road is necessary for Kotlin Island to become a concentrated center for erecting the barrier complex. More than a million cubic meters of concrete will be placed in the structures that will permit the passage of ships alone. This means that a powerful industrial base must be formed here with a concrete plant, a center for servicing and repairing technology and for fabricating components. By putting the road for technological machines into operation it will be substantially simpler to solve this problem which, undoubtedly, will speed up the erection of the "sea shield" for Leningrad and bring a victorious conclusion to Operation "Barrier" closer.

...We are walking along the dam that was made consistently smooth by powerful BelAZ's and KRAZ's [vehicles produced at the Belorussian and Kremenchug motor vehicle plants]. The chief engineer for managing the mechanized construction work, Boris Grigor'yevich Zavediy, and chief of SMU-11 [Construction and Installation Administration-11], Viktor Aleksandrovich Kalinin, speak about the amount of work that was completed, about the long-range construction that

is drawing nearer, and warmly recall on whom they depended for the powerful technology. The majority of hydraulic construction workers is young army reserves that received strong tempering in the army and navy. The supervisors of the construction list the names of A. Yefimov, V. Yevsti gneyev, S. Stashinskiy and N. Zadorozhniy and many other shock workers that came from various parts of the country. They recall foreman Nikolay Vasil'yevich Minayev with special warmth who defended Kronshtadt from the fascist invaders during the terrible days of the war.

They are breaking bottles on the floating crane proclaiming the start of placing the last cubic meters of soil. Huge dump trucks are dumping rocks and sand into the water. Scrapers and rollers are efficiently smoothing and packing the fill.

Then the meteorologist reports to the main desk of the barrier structures management, "Storm warning! 'Long waves' will arrive in five hours."

A command is given and steel shields weighing 5,000 tons each move along rails laid across the bottom of the ship channel and close the water passage opening. Stop, elements!

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## CONSTRUCTION METHODS AND MATERIALS

### BOOK ON PRODUCTION, APPLICATIONS OF ARBOLITE REVIEWED

Moscow ZHILISHCHNOYE STROITEL'STVO in Russian No 12, Dec 84 pp 28-29

[Review of book by I. Kh. Nanazashvili "Arbolit--Effektivnyy Stroitel'nyy Material" [Arbolite--as Efficient Building Material]: "Arbolite in Construction"]

[Text] The book published by Stroyizdat, "Arbolite--an Efficient Building Material" will, undoubtedly, attract the attention of builders, planners, and architects. The scientific propositions and practical recommendations that are stated in this new publication will aid in successfully solving the problems in reconstructing the village in light of the requirements of the USSR Food Program.

The first small section of the book acquaints readers with the structural, physical and mechanical properties of arbolite. The primary raw materials necessary for obtaining arbolite are cited and the complete characteristics of arbolite on a wood filler are given since it is products and components that are most of all manufactured from it.

In the second section of the book the specific properties of an organic cellulose filler and its effect on the quality of arbolite are described. Research on the chemical aggressiveness of a vegetable extraction filler in its behavior toward cement is generalized and its technical characteristics are given. In particular, the interrelationship between the compaction of the arbolite mixture and the structural features of the wood is explained. A uniform method of testing samples to determine the adhesion of the wood to the cement stone is suggested which would make it possible to study the features of the wood. The following parameters are considered in accordance with this method: the composition of previous wood in the contact zone, the surface of the cut (radial or tangential), the direction of the grain, the roughness of the surface, the conditions for manufacturing and storing the models (samples).

Of particular interest to the reader is the section "The Use of Arbolite in Construction" and the sections devoted to the production of components and products from it to build housing units in the village. Arbolite lends itself as an exceptional wall material possessing a high level of thermal insulation with the ability to maintain dry conditions inside premises since moisture does not condensate on its surface.

The author points out the substantial economic gain from the use of components made from arbolite. For example, the cost of one square meter of wall made from arbolite is 5 to 7 rubles lower than the cost of a wall made from brick or porous clay filler concrete. Arbolite has high thermal technical indicators in enclosure components due to its large cellular structure.

A comparison of the technical and economic indicators of panels made from arbolite are given in the book which were prepared based on designs by the TsNIIIEP [Central Scientific Research Institute for Experimental Design] for Rural Construction, the NIIZhB [Scientific Research Institute for Reinforced Concrete], the Kray Kolkhoz [collective farm] Design Institute in the Krasnodar Kray Kolkhoz Association and other organizations and enterprises. The experience gained in the experimental construction of buildings in which arbolite is used in roofs and coverings as load-bearing members with a span of 4 and 6 meters is set forth.

The experience gained in using high-strength arbolite (grade M 50 or higher) as a floor base having greater resistance to varying moisture conditions is interesting. The production of arbolite tiles under linoleum and parquet has been developed at the DOZ [not further identified] in the Main Baku Construction Association based on a design by the Orgtekhstroy Trust in the AzSSR Ministry of Industrial Construction. The composition of an arbolite mixture is selected and technological conditions are chosen that would make it possible to obtain structural thermally insulated grade M 50 arbolite with an average density of 850 to 900 kg per cubic meters.

In the eighth section a design for a one-story one-apartment housing unit in the 35 series is recommended for extensive use in villages which has been revised by the Saratov "Sel'stroymaterialy" PTPO [not further identified] in the Russian Kolkhoz Construction Association in an arbolite variation. The farmstead includes a house and farm structure with garage. All the load-bearing and enclosure components (foundation panels, roof slabs, wall panels and partitions between rooms) were designed from arbolite on a wood base. The weight of buildings made from arbolite is less than those from reinforced concrete and porous clay filler concrete by a factor of 2.2.

In the ninth section the author familiarizes the reader with the production and use of small-size arbolite modular units for low-rise construction in a rural location. Subsequently a section for producing modular units from grade M 35 arbolite has been set up at the Volokolamsk Experimental Plant for Building Components. The technological line was developed by the PTB [not further identified] in the Moscow Oblast Building Materials Association under the Moscow Oblast Soviet Executive Committee using a SB-119-1M mechanized concrete mixing installation. The technology for manufacturing arbolite modular sections is given.

The fact that it is based on factual material and data obtained during the course of research and experimental production is an indisputed merit of I. Kh. Nanazashvili's book. A multitude of organizations and enterprises that are engaged in the design and manufacture of components and pieces made from arbolite are mentioned.

In the ninth section the author gives the results of the knowledge that has been accumulated in the production and use of arbolite products. He draws a substantiated conclusion that the most efficient trend in the use of waste products from wood is to obtain arbolite from them.

It goes without saying that the scientific propositions and practical recommendations that are stated in the new publication from Stroyizdat can be successfully used by researchers and producers for perfecting and improving the quality of arbolite and pieces and components made from it.

In conclusion it should be noted that the new book contains more than 20 tables and 30 illustrations. This aids in more fully digesting the extensive factual material. This book can be successfully used by specialists in rural housing construction in their everyday work.

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